the OIL AND GAS JOURNAL

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Tools of our Trade No. 1

PRICE 50 CENTS

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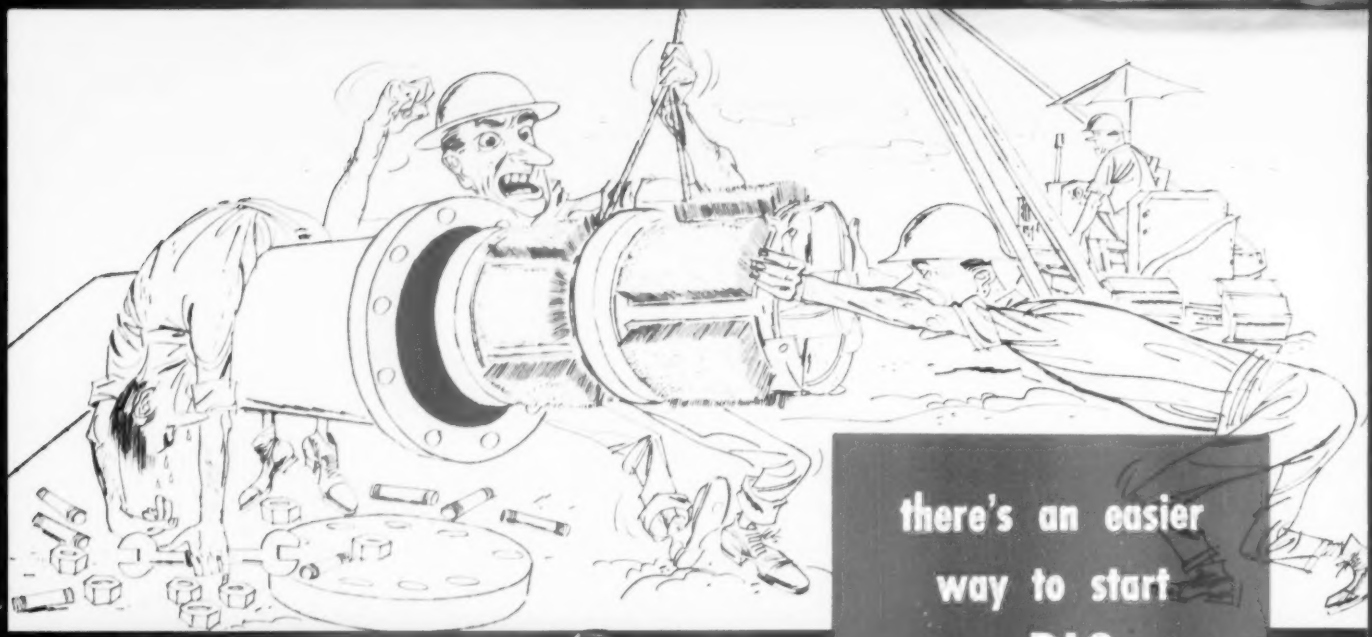

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An oversize barrel on the sending and receiving ends of a line, slightly larger than the diameter of the pig, makes it easy to send or catch a scraper. Line pressure does the heavy work. But to make the job doubly simple and easy, you need UNIBOLT Hinged Scraper Traps. To open them, all you need do is release two bolts and the blanking plug swings open like a door. No heavy lifting. Nothing to fall on workmen. No time-consuming blind flanges to break out and make up. No danger of leaks. A self-sealing resilient ring assures a pressure-tight closure.

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JUNE 1, 1953 VOL. 52 NO. 4

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In Brief . . .

1. REMOTE FLOW CONTROL . . . Two telephone circuits are used to perform the telemetering and control functions for a remotely controlled, unattended terminal station on the 30-in. pipe line of Southern Counties Gas Co. in southern California. One circuit is used to transmit a signal representing the total volume through the station. The other is used to transmit regulator-valve upstream and downstream pressures, and, on option, to position the set point of the differential-pressure volume controller.

•

2. NEW PETROCHEM PLANT . . . The National Petro-Chemicals Corp. plant at Tuscola, Ill., is designed to process a maximum of 425,000,000 cu. ft. of gas per day. From this stream, 10,000,000 cu. ft. per day of ethane will be extracted for cracking. Ethylene thus produced will be used to synthesize 40,000,000 gal. per year of ethyl alcohol and 50,000,000 lb. per year of ethyl chloride. Ethane and heavier hydrocarbons are removed from pipeline gas obtained from the Panhandle Eastern Pipe Line.

•

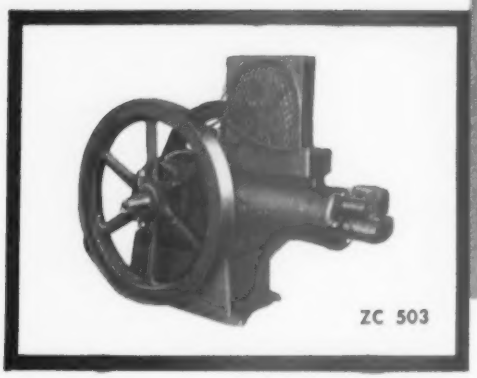
3. OIL-FIELD REPORT . . . Midland Farms oil field in Andrews County, Texas, produces from the Grayburg limestone in the Midland basin. It is the latest oil field in the Permian basin to reach the status of a major producing area. Currently the reservoir is producing more than 22,000 bbl. of oil per net producing day from 306 oil wells. More than 12,240 acres have been proved productive by these wells drilled on a spacing pattern of 40 acres per well.

•

4. MORE UNDERGROUND STORAGE . . . Underground storage capacity for liquefied petroleum gas now is well over 3,000,000 bbl., having risen sharply from the 2,000,000 bbl. available at the end of 1952. Projected available capacity at the end of 1953 is 6,000,000 bbl. The ultimate capacity in 1954, including projects now under way and those which will be completed in late 1953 and early 1954, totals approximately 8,500,000 bbl.

•

5. FIELD-PLANT ECONOMICS . . . As the price of gas continues to increase, gasoline and cycling-plant revenues decrease. Reduction in costs that can be controlled seems mandatory for continued operation on a sound economic basis. Suggested ways are: (1) reduction in the labor force, by better planning and organization; (2) institution of a good preventive-maintenance program; (3) closer supervision over plant operations and control tests; (4) reduction of gas wastage; (5) employe education for cost consciousness.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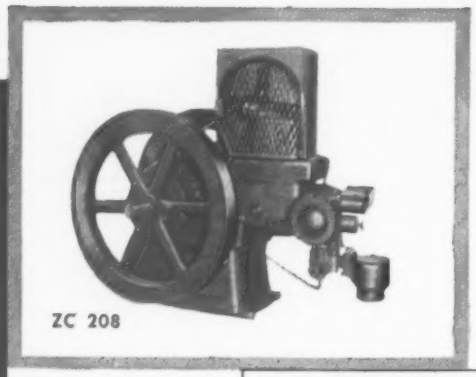
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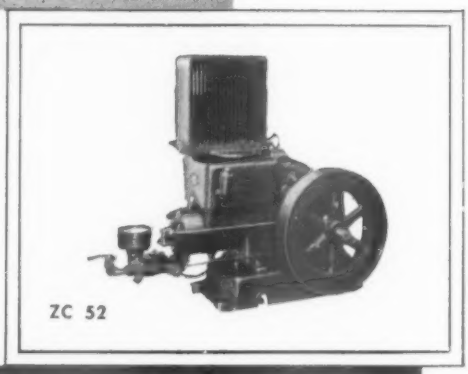
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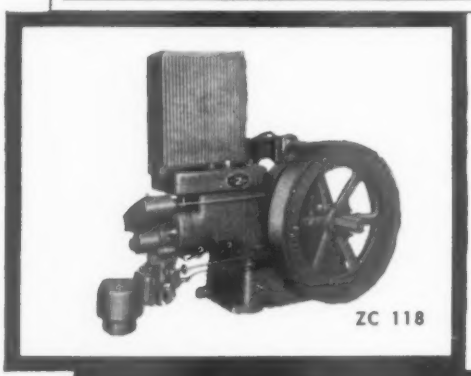
See your local supply store about the "ZC" line . . . or write Fairbanks, Morse & Co., Chicago 5, Illinois.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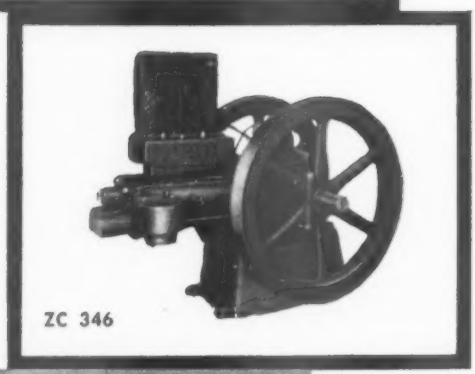
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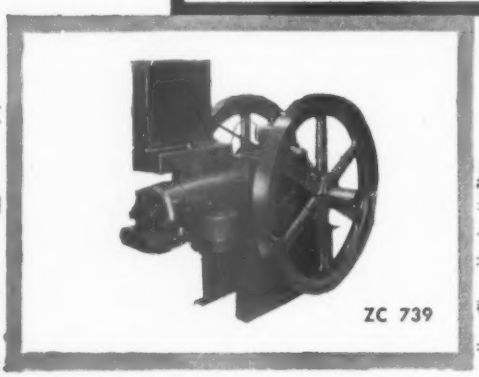
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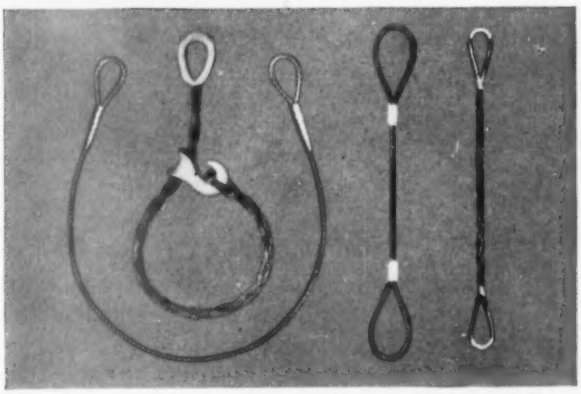

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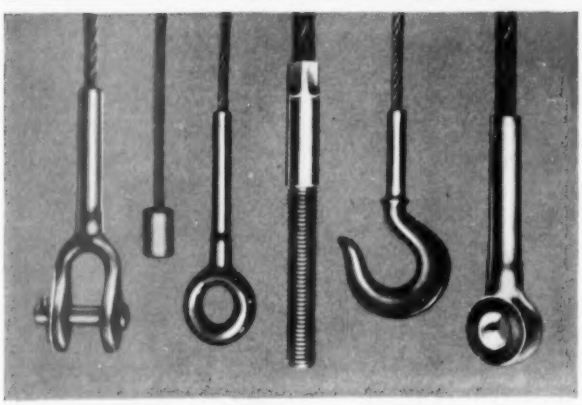

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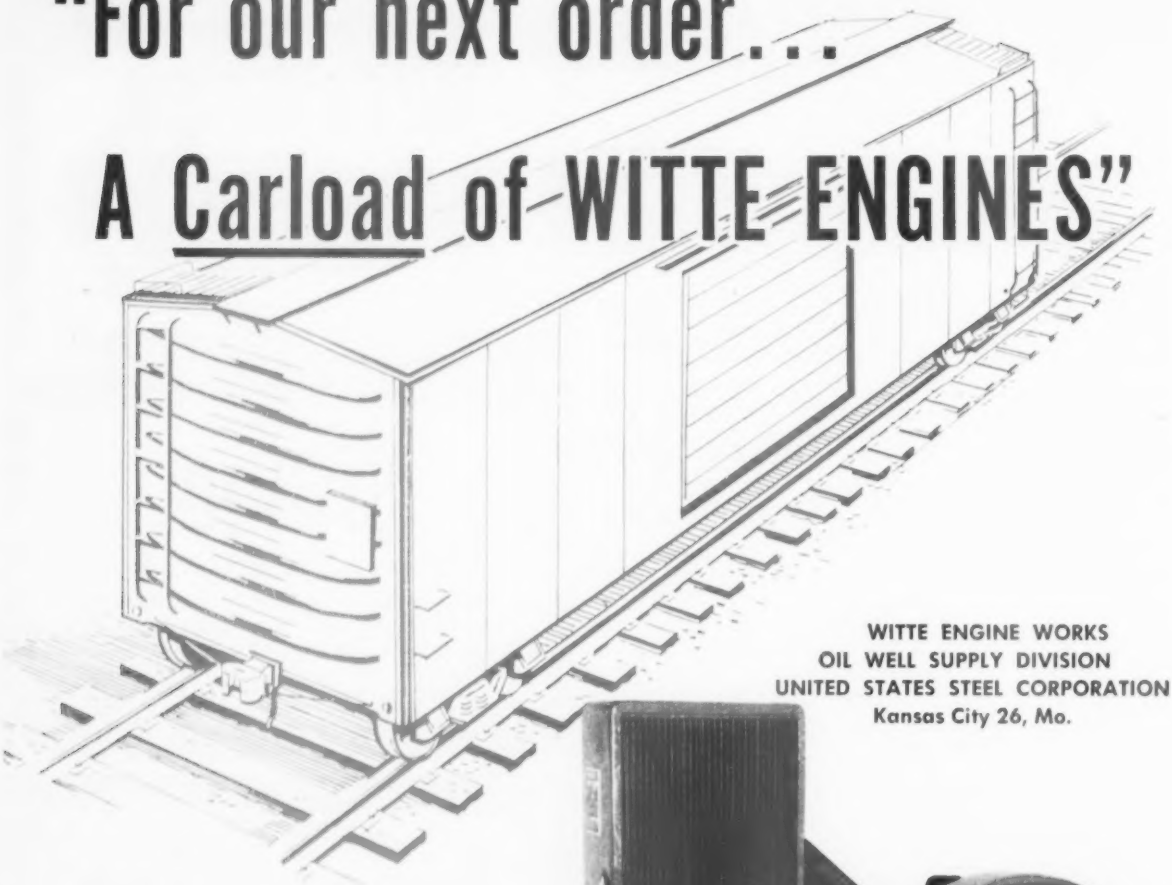

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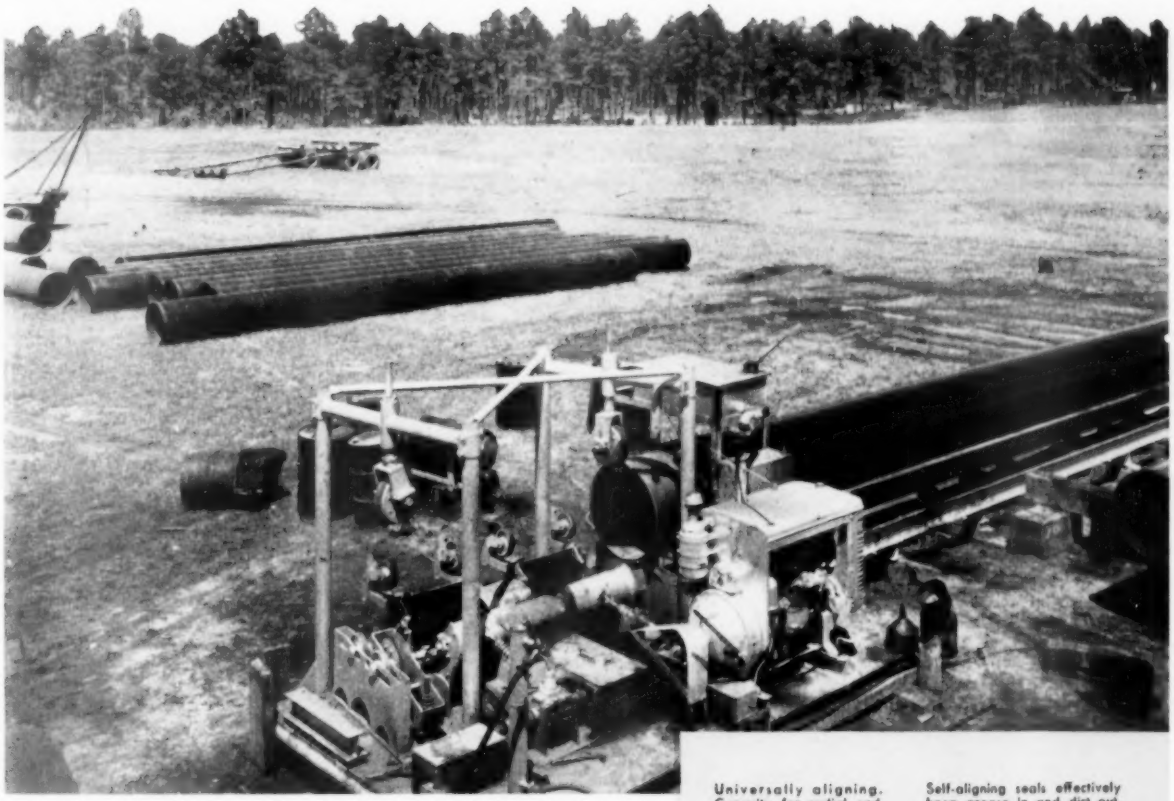

Every bearing on this General Manufacturing Company's Pipe Cleaning and Priming Machine is a Link-Belt ball bearing pillow block or flanged unit.

It's LINK-BELT bearings throughout on this pipe cleaning and priming machine

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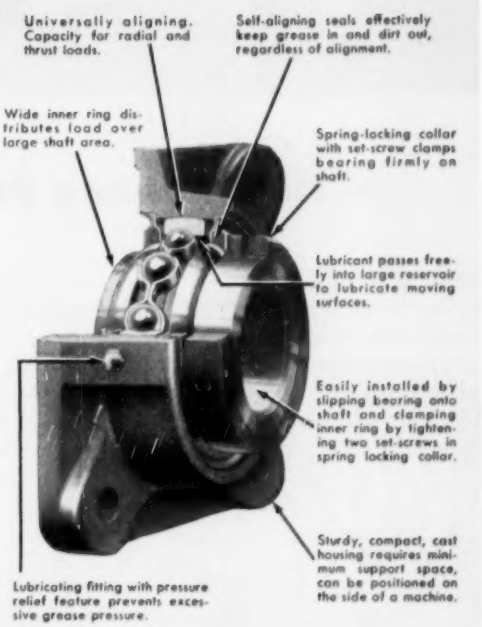
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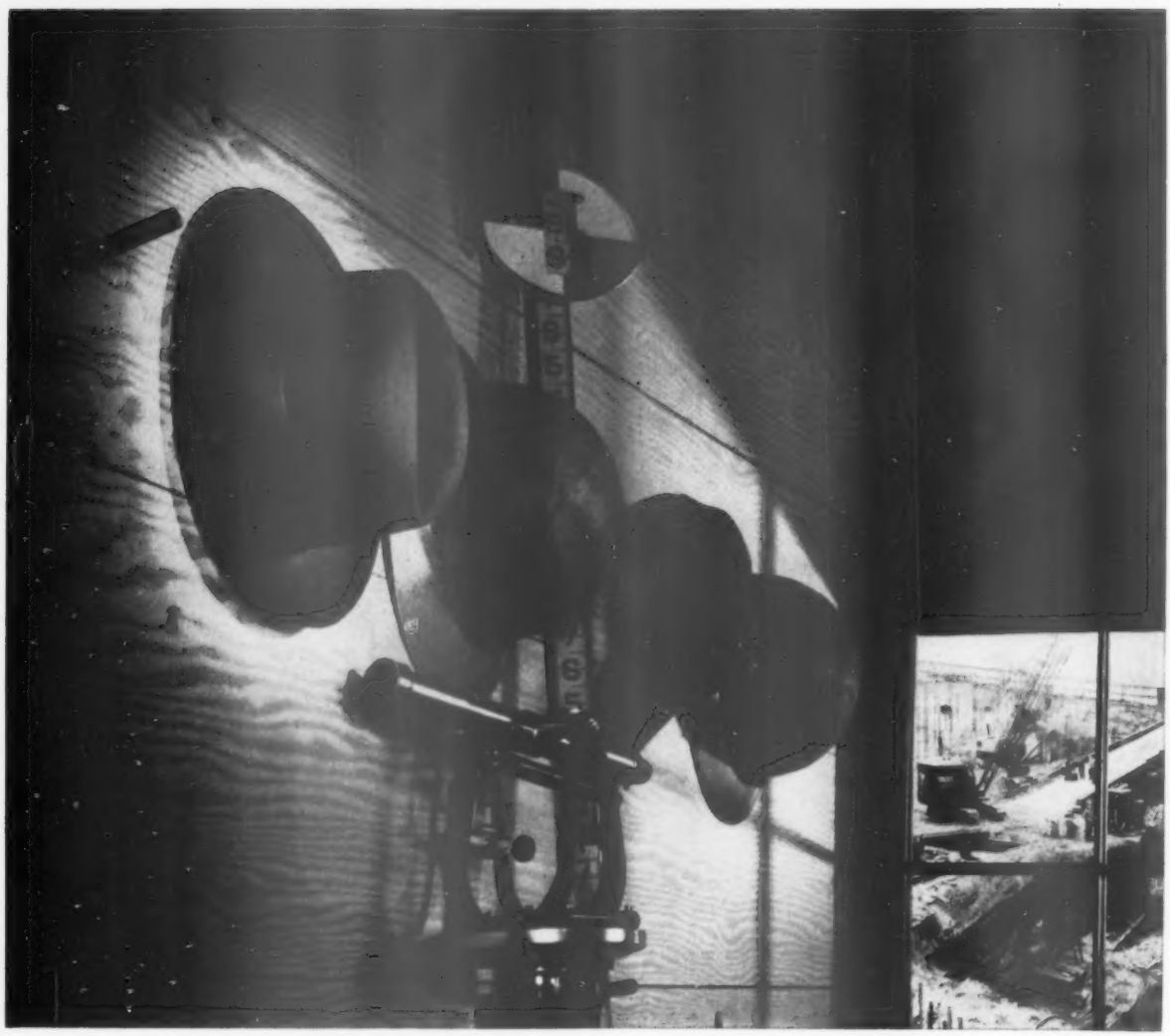

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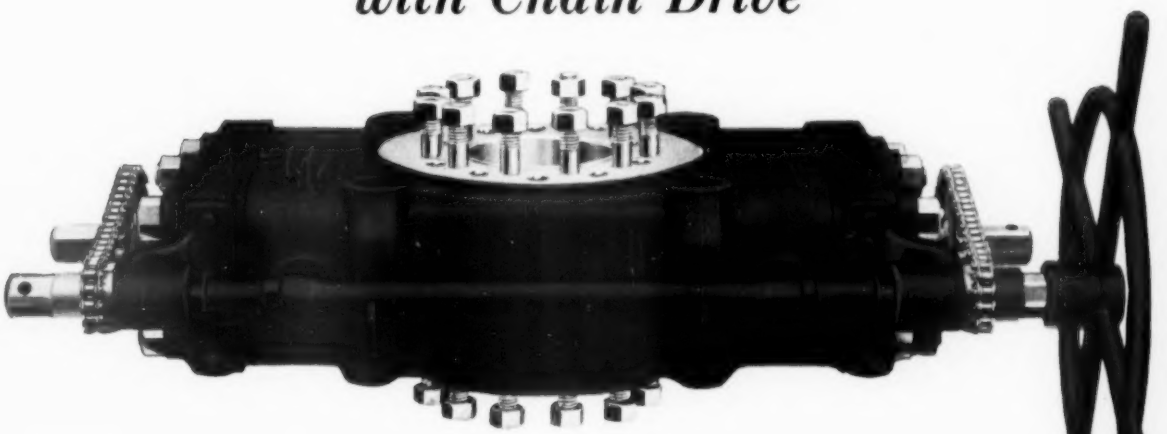
with Chain Drive



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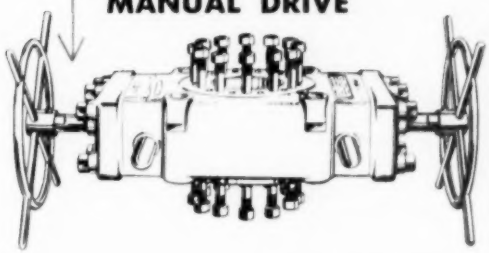
BLOWOUT PREVENTER
MANUAL DRIVE



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BIW PX-350 Stripper Type Tubing Head

The BIW PX-350 is an efficient and economical method for suspending tubing on completion and, later on, for working over the well or putting it on pump. The Tubing Head can be converted readily into a threaded hanger suspension-type tubing head, a slip suspension-type pumping head, or it can be equipped with a gas lift hanger.

Figure 2 shows the construction of the heavy duty Neoprene stripper. This stripper permits running and pulling tubing without the use of additional blowout preventer equipment. The one piece rubber packoff is molded into a steel spider ring to prevent stripper motion while the tubing is being raised or lowered. Tubing collars are passed readily; well pressure is sealed in effectively.

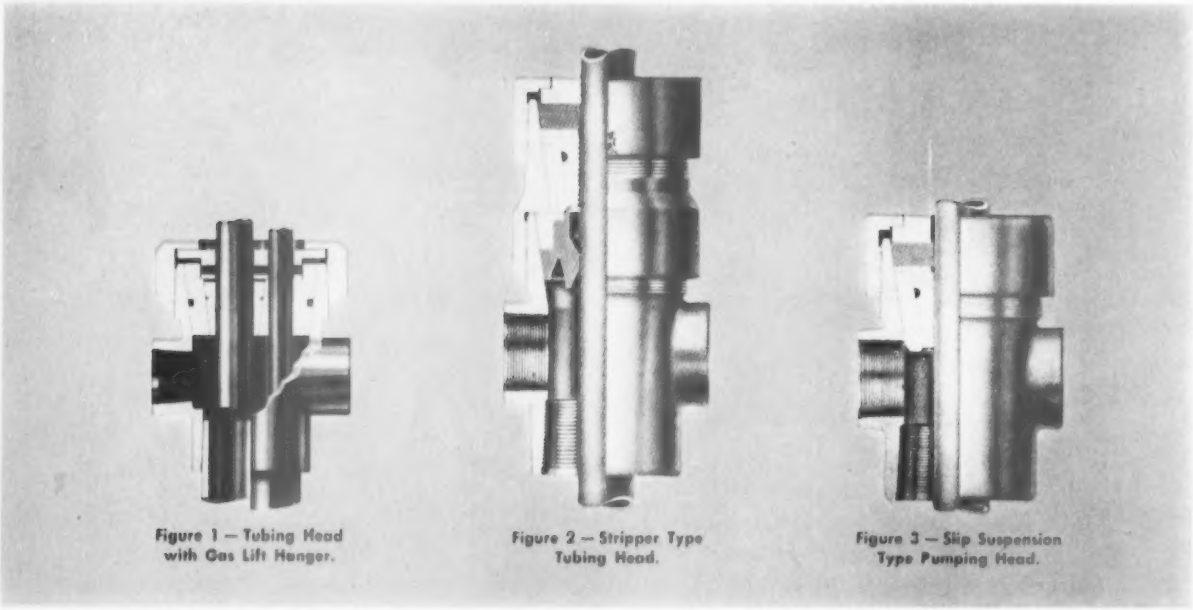

Figure 1 — Tubing Head with Gas Lift Hanger.

Figure 2 — Stripper Type Tubing Head.

Figure 3 — Slip Suspension Type Pumping Head.

The head, as shown in Figure 1, can be converted to a gas lift head by removing the stuffing box assembly, slips, slip bushing, slip bowl, and stripper assembly, and substituting a gas lift hanger. The gas lift hanger utilizes slips for suspension of the gas pipe and is threaded for the tubing connection.

The ease of conversion to an efficient pumping head is shown in Figure 3. The stripper assembly and slip bowl are removed. The slip assembly is seated in the body of the head, and the stuffing box is made up on the body of the head instead of on the slip bowl.

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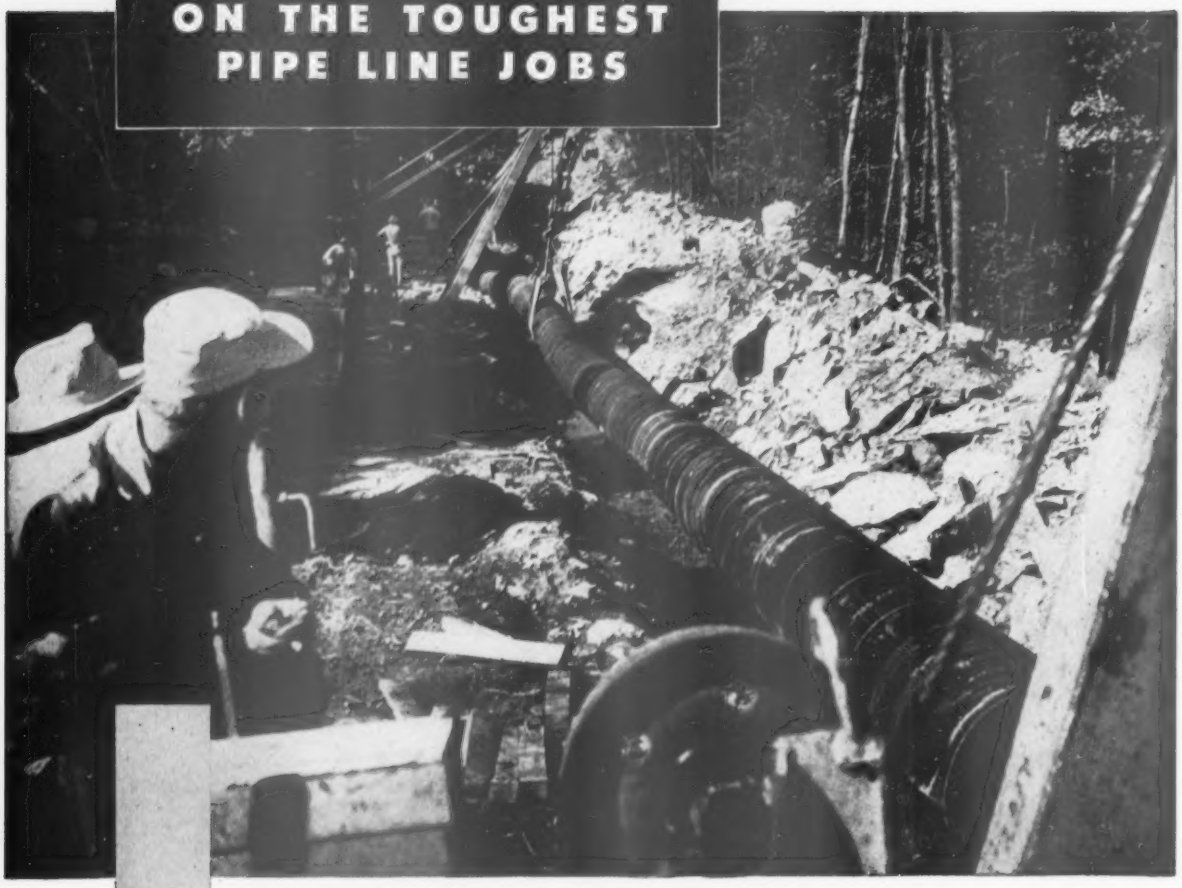

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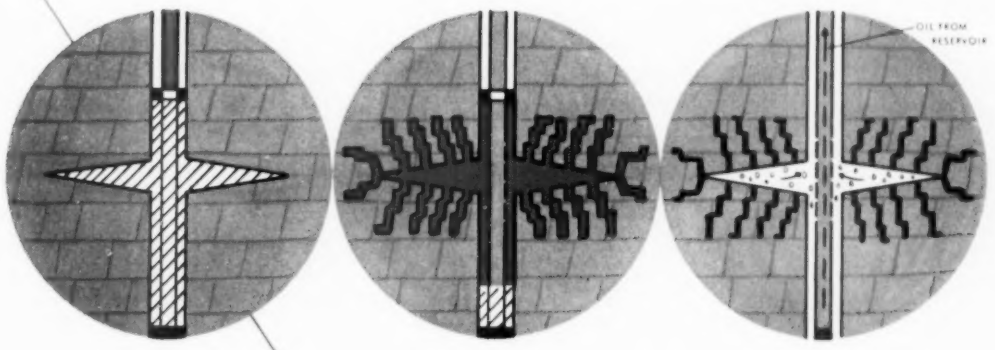

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VETCO

OFF-N-ON

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pays for itself in rig time saved...

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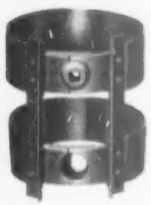
So now with complete freedom you can use pipe progressively throughout the string. The same rubbered pipe is not used at top hole all the time. You no longer need to lay down rubbered pipe while tripping. VETCO Off-N-On Protectors will pay out in rig time saved.

The forged cam lock is built right into the VETCO Protector. Nothing to come loose and fall in the hole. Nothing can loosen the tight lock.



The alloy steel bands form a strong skeleton to grip the pipe. Rubber is compressed between the metal bands and the pipe for a tight grip which prevents movement of the protector.

GRIBBIN & BAYLOR

2930 PEASE AVE., HOUSTON, TEXAS — Phone: PR eston 8156
324 NORTH VICTORY BLVD., BURBANK, CALIF. — Phone: Rockwell 9-2543
507 BRYAN STOCK TRAIL, CASPER, WYOMING — Phone: 5942

One Way
to Lower High Corporation Taxes

(but not recommended)

Industrial eye accidents can take a real "bite" out of any company's net three ways: in the production they stop, the production they slow (substitute workers don't do so well), and in the cost of care and compensation.

In the effort to cut down* these avoidable taxes on profits, a program that safeguards a valued worker's eyes is sound policy. One large company by the use of safety glasses averaging $2.30 cut its compensation costs from a high of $2.80 to $.40 per worker per year. In the AO records are many such examples of savings.

How about *your* company? Eye injuries are as *certain* as death and taxes unless there is a program that controls them. Ask your AO Safety Representative for complete details.

*98% of eye injuries are *eliminated* when workers wear safety goggles.

AO's *Industrial Vision Program* Increases Production, Decreases Accidents. Write today for booklet "Improved Industrial Vision" to American Optical Company, 546 Vision Park, Southbridge, Mass.

American Optical
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

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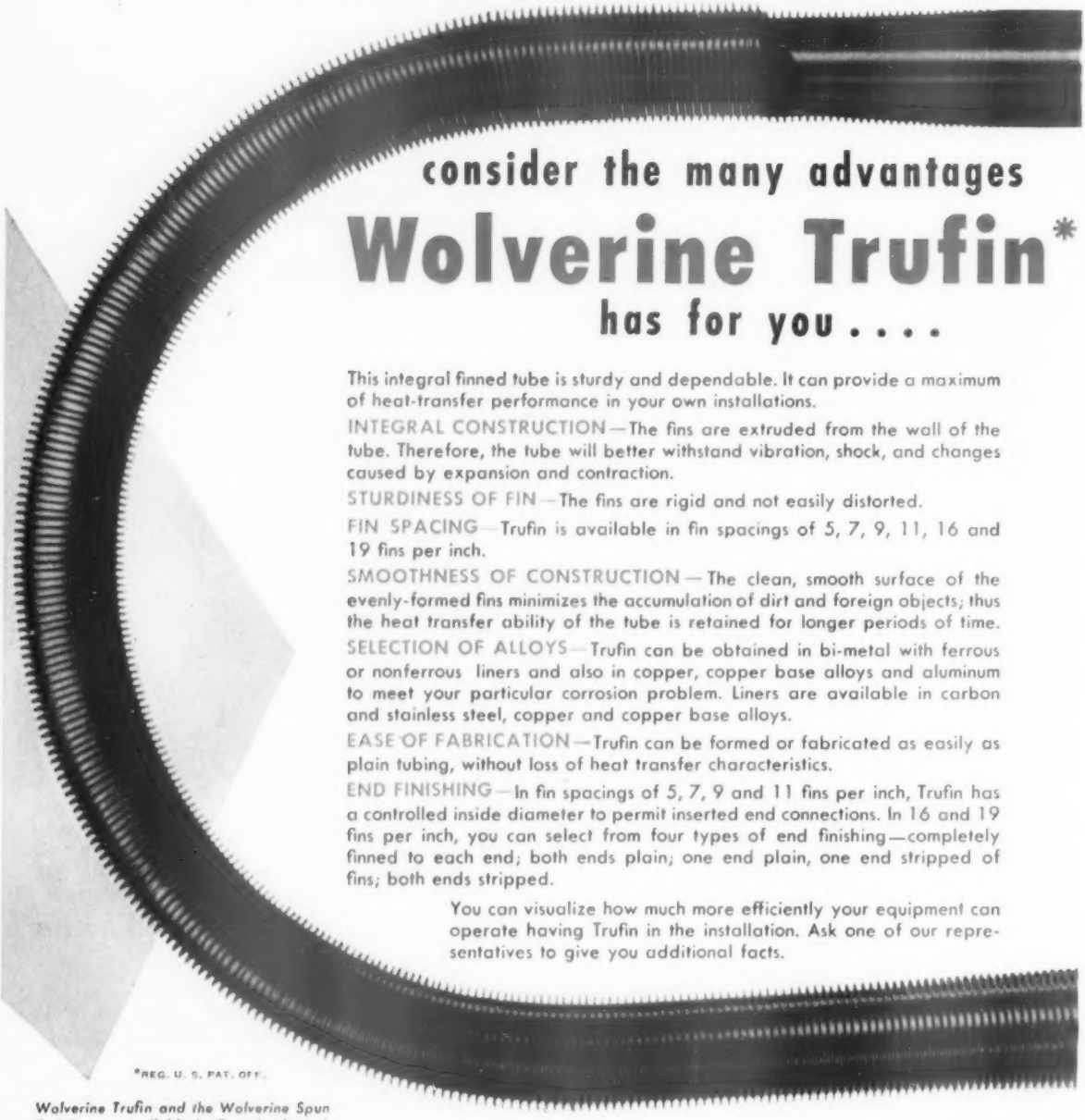
FOR CONDENSING AND COOLING WITH FORCED AIR COOLING SECTIONS AND OTHER HEAT TRANSFER APPLICATIONS



consider the many advantages

Wolverine Trufin*

has for you . . . .

This integral finned tube is sturdy and dependable. It can provide a maximum of heat-transfer performance in your own installations.

INTEGRAL CONSTRUCTION—The fins are extruded from the wall of the tube. Therefore, the tube will better withstand vibration, shock, and changes caused by expansion and contraction.

STURDINESS OF FIN—The fins are rigid and not easily distorted.

FIN SPACING—Trufin is available in fin spacings of 5, 7, 9, 11, 16 and 19 fins per inch.

SMOOTHNESS OF CONSTRUCTION—The clean, smooth surface of the evenly-formed fins minimizes the accumulation of dirt and foreign objects; thus the heat transfer ability of the tube is retained for longer periods of time.

SELECTION OF ALLOYS—Trufin can be obtained in bi-metal with ferrous or nonferrous liners and also in copper, copper base alloys and aluminum to meet your particular corrosion problem. Liners are available in carbon and stainless steel, copper and copper base alloys.

EASE OF FABRICATION—Trufin can be formed or fabricated as easily as plain tubing, without loss of heat transfer characteristics.

END FINISHING—In fin spacings of 5, 7, 9 and 11 fins per inch, Trufin has a controlled inside diameter to permit inserted end connections. In 16 and 19 fins per inch, you can select from four types of end finishing—completely finned to each end; both ends plain; one end plain, one end stripped of fins; both ends stripped.

You can visualize how much more efficiently your equipment can operate having Trufin in the installation. Ask one of our representatives to give you additional facts.

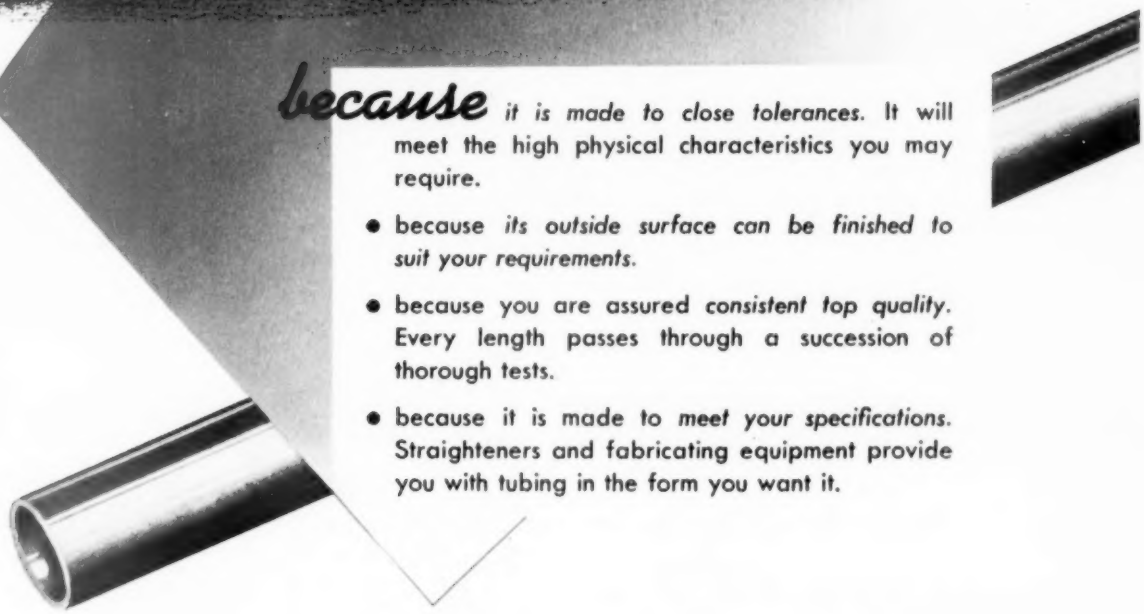
*REG. U. S. PAT. OFF.

Wolverine Trufin and the Wolverine Spun End Process available in Canada through the Unifin Tube Co., London, Ontario.

WOLVERINE TUBE DIVISION
of CALUMET & HECLA, INC.
Manufacturers of Tubing Exclusively
1459 CENTRAL AVENUE • DETROIT 9, MICHIGAN
ESTABLISHED 1916
Plants in Detroit, Mich. & Decatur, Ala. *Sales offices in Principal Cities*

EXPORT DEPARTMENT, 13 E. 40TH ST., NEW YORK 16, N. Y.

Choose Wolverine's Electric-Welded Steel Tube for these important reasons...



because *it is made to close tolerances.* It will meet the high physical characteristics you may require.

- because *its outside surface can be finished to suit your requirements.*
- because you are assured *consistent top quality.* Every length passes through a succession of thorough tests.
- because it is made to *meet your specifications.* Straighteners and fabricating equipment provide you with tubing in the form you want it.

With such worthwhile advantages available to you, you should include this Wolverine Electric-Welded Steel Tube in your buying considerations, particularly if you're thinking of ways to improve your product or to effect economies in its manufacture.

Wolverine's experience in producing tube exclusively, augmented by continuous research and product development has been carried on for well over 30 years. Wolverine engineers have tackled and *solved* all sorts of tubing problems—why not let them analyze yours?

Wolverine's Customer Engineering Service is available without obligation. *Write or call Wolverine's Customer Engineering Service.*

ESTABLISHED 1916

WOLVERINE TUBE DIVISION

of CALUMET & HECLA, INC.

Manufacturers of Tubing Exclusively

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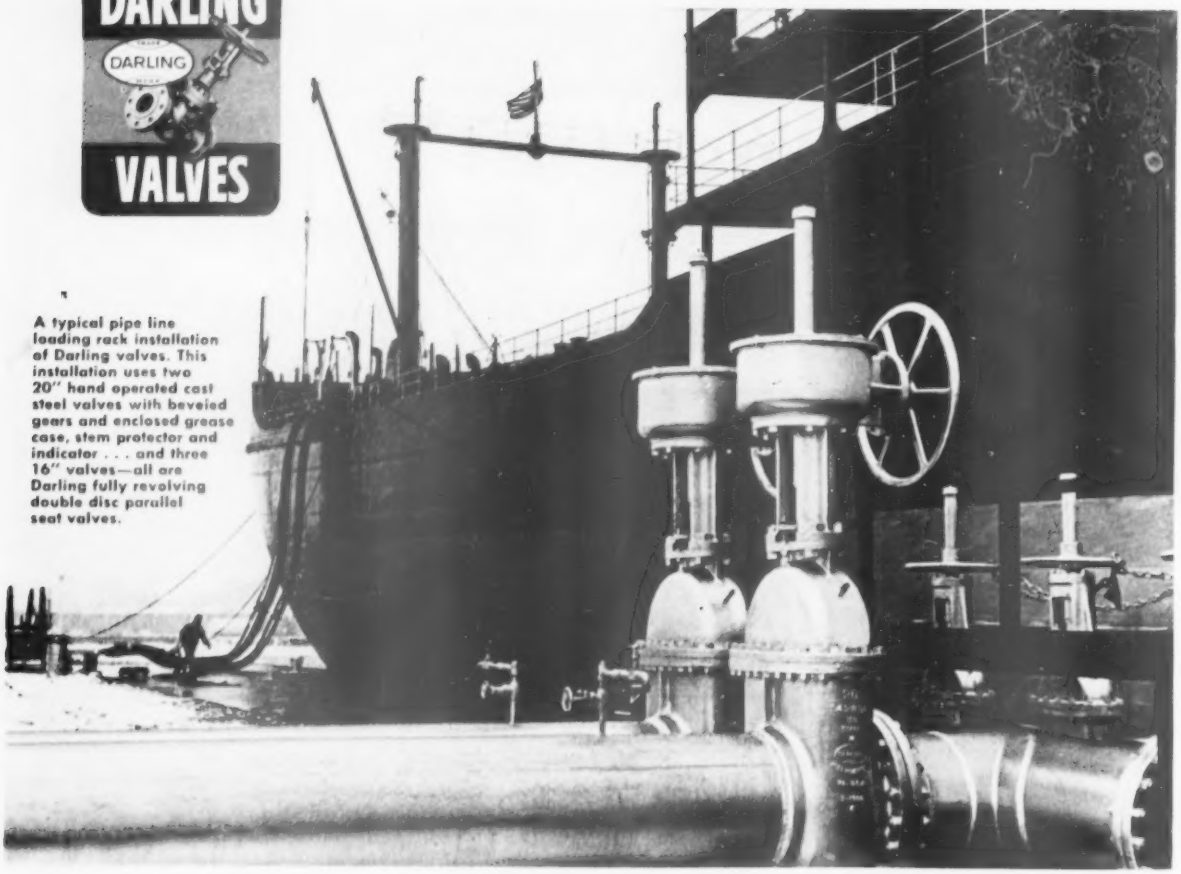
DARLING

DARLING

VALVES



A typical pipe line loading rack installation of Darling valves. This installation uses two 20" hand operated cast steel valves with beveled gears and enclosed grease case, stem protector and indicator . . . and three 16" valves—all are Darling fully revolving double disc parallel seat valves.

How they help keep cargo schedules with DARLING Revolving Disc GATE VALVES

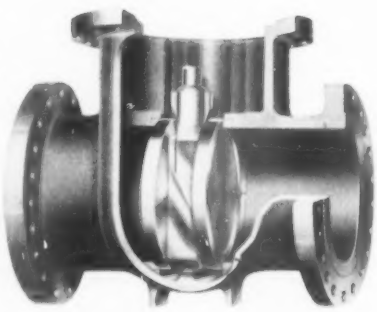
TROUBLE-FREE valve service on tanker loading racks is helping to build an enviable valve service record for Darling *fully revolving double disc parallel seat* gate valves.

The big advantage here, as in all Darling *revolving disc* gate valve installations, is the cut in down time. These unique cast steel gate valves automatically compensate for valve body distortion. Moreover, Darlings give better service longer because their *fully revolving double discs* distribute disc and seat wear uniformly. And Darling valves are always easier to operate, even under severe pressure loads or radical changes in temperature.

You save time too when it does become necessary to service Darling valves because all working parts can be replaced without removing the valves from the line. And any one, or all of the four working parts, can be quickly replaced on the spot.

Wide Range of Sizes

These Darling *fully revolving double disc parallel seat* gate valves are available in a wide range of sizes and types for all gas and oil line requirements. Ask for general descriptive literature or outline your specific service needs so we can send you the exact information you need.



Cutaway showing the extreme simplicity of Darling's unique fully revolving double disc parallel seat gate valve principle.

DARLING VALVE & MANUFACTURING CO.

Williamsport 1, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ontario

ANCHOR

DUCTILE-SLEEVE, TWO-WIRE BRAID HOSE ASSEMBLIES

for extra safety in high-pressure usage

Factory assembled to your specifications — you get just what you want — plus an extra margin of safety and dependability.

Exclusive, ductile-sleeve, swaged-on grip makes coupling virtually part of hose reinforcing wire — prevents blow-offs.

No leaks — positive seal eliminates leakage even under extreme pressures.

Cuts assembly costs — neat, compact design makes installation fast and easy — gives you a better-looking job.

Get all the details. Attach coupon to your letterhead and mail today.

NEW!
REVOLUTIONARY
ANCHOR FLANCO
SPLIT-FLANGE CLAMP
Positive leakproof connection without threaded joints. Bolt centers are located to distribute the forces evenly and prevent tilting of the clamp halves. Easy to assemble with small automotive-type wrench.

D-16

ANCHOR COUPLING CO. INC.

Main Office and Factory: LIBERTYVILLE, ILLINOIS

FACTORY BRANCHES: DETROIT, MICHIGAN • DALLAS, TEXAS

Anchor Coupling Co. Inc.
Dept. OG63, Libertyville, Illinois
I'd like to know more about
☐ Anchor Ductile-Sleeve Hose Assemblies
☐ New Anchor Flanco Split-flange clamp-type coupling
Send me more information.

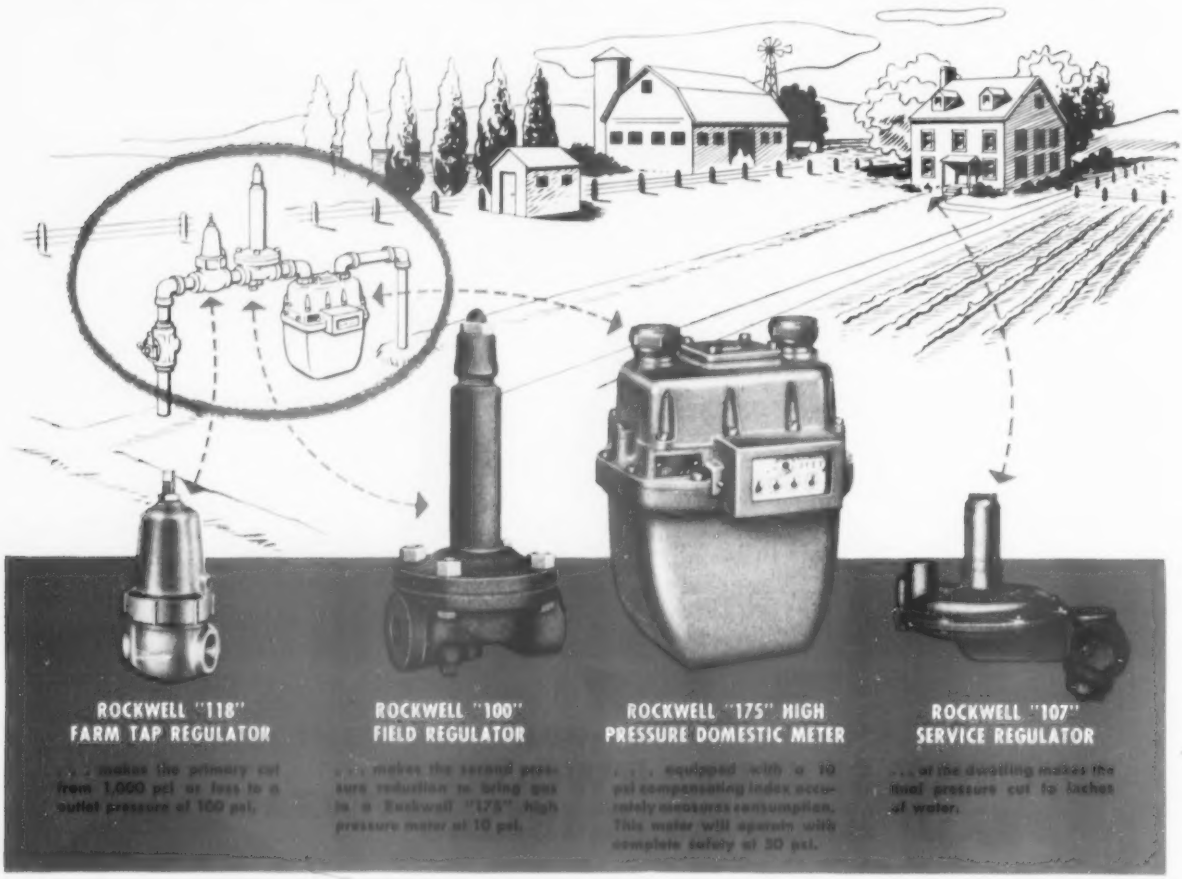
Name ..... Title .....

Company Name .....

Company Address .....

City ..... ( ) State .....

How to
SERVE ISOLATED CUSTOMERS
DIRECTLY FROM HIGH PRESSURE TRANSMISSION LINES


ROCKWELL "118" FARM TAP REGULATOR
. . . makes the primary cut from 1,000 psi or less to a outlet pressure of 100 psi.
ROCKWELL "100" FIELD REGULATOR
. . . makes the second pressure reduction to bring gas to a Rockwell "175" high pressure meter at 10 psi.
ROCKWELL "175" HIGH PRESSURE DOMESTIC METER
. . . equipped with a 10 psi compensating index accurately measures consumption. This meter will operate with complete safety at 50 psi.
ROCKWELL "107" SERVICE REGULATOR
. . . at the dwelling makes the final pressure cut to inches of water.

THE SAFE, SURE, ECONOMICAL WAY

Here's a simple low cost way to serve gas to farms, ranches and small industries in the proximity of your high pressure pipe lines. The two stage method of reduction provides a good safety factor since both the Rockwell "118" and "100" regulators are individually designed to handle high line pressures. Too, by dividing the regulating load, heavy mechanical stress, valve abrasion and wire cutting are eliminated. The Rockwell "175" meter with 50 lb working pressure case is specifically designed for this type of service. It can be furnished with either a standard index or indexes compensating for 10 lb or 50 lb measurement. *Write for full details and prices.*

ROCKWELL — You Can RELY ON ROCKWELL

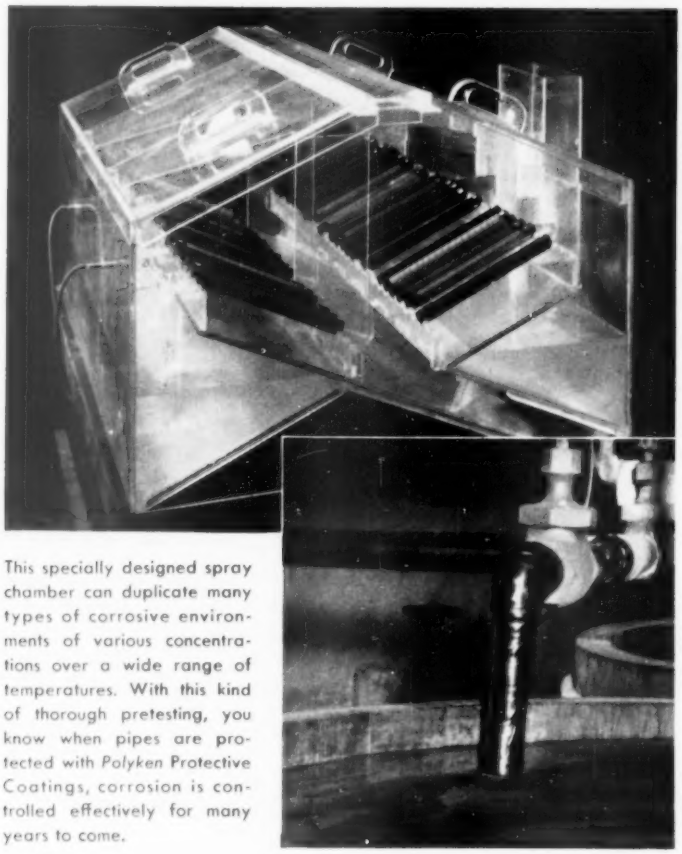
ROCKWELL MANUFACTURING COMPANY

PITTSBURGH 8, PA. Atlanta Boston Chicago Houston Kansas City
Los Angeles New York Pittsburgh San Francisco Seattle Tulsa

Preview of Pipe "Years from Now"... Shows

long-range protection

by Polyken protective coatings



This specially designed spray chamber can duplicate many types of corrosive environments of various concentrations over a wide range of temperatures. With this kind of thorough pretesting, you know when pipes are protected with *Polyken* Protective Coatings, corrosion is controlled effectively for many years to come.

This spray chamber in the *Polyken* laboratory speeds up corrosion action so you can see—in a matter of weeks—how a field application of *Polyken* Protective Coating fights corrosion through the years.

Take the new *Polyken* Protective Tape Coating as an example. Extensive field and laboratory tests, including the spray chamber, showed that this tape would safeguard piping from contact with acid fumes and spray. The actual application, shown in the lower photograph, confirmed the tests. That's corrosion protection . . . previewed and proved.

Actually a single wrap of this new *Polyken* Protective Tape Coating is a bond of two anti-corrosion barriers—each one highly effective in itself. Next to the pipe is a specially developed synthetic adhesive that provides protection over a wide range of temperatures and conditions. Because this adhesive is unusually thick, all surface voids, pits and pores of the pipe are filled in.

A new process bonds this 4 mil adhesive to an 8 mil polyethylene film, forming the second corrosion barrier that has all the well-known protection polyethylene provides.

This new *Polyken* Protective Tape Coating is available now in two colors: No. 900, black and No. 910, gray. Test samples and further information are ready for you.

TAILORED TO YOUR JOB

Polyken®

INDUSTRIAL TAPES

Department of Bauer & Black
Division of The Kendall Company

***Polyken*, Dept. OGF**
222 West Adams St., Chicago 6, Illinois

Please send me samples and further information on *POLYKEN* PROTECTIVE TAPE COATINGS.

Name_____ Title_____

Company_____

Street Address_____

City_____ Zone____ State_____

The kiss of Corrosion!

In 1952 alone, millions of feet of underground piping will fall victim to corrosion . . . needlessly. This excessive destruction of valuable equipment can be eliminated with a **HARCO** engineered cathodic protection system.

Only a job-engineered system which provides for every factor affecting your installation can assure complete protection from corrosion. **HARCO** has pioneered in the field of cathodic protection and is equipped to engineer and install systems which will entirely eliminate the menace of corrosion.

For maximum pipe life, minimum maintenance, and protection from the hazards caused by corrosion damage . . . **call upon HARCO!**

Write today for catalog or call MOntrose 2-2080

THE *Harco* CORPORATION

Cathodic Protection Division

16961 BROADWAY • CLEVELAND, OHIO

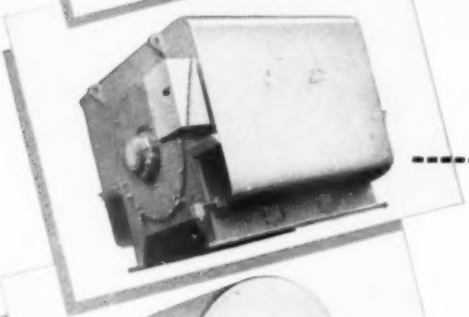
Get the Motor You Need

ALLIS-CHALMERS
Large Induction MOTORS

Because Allis-Chalmers builds a complete line of induction motors for the petroleum industry, you can select the exact degree of protection needed

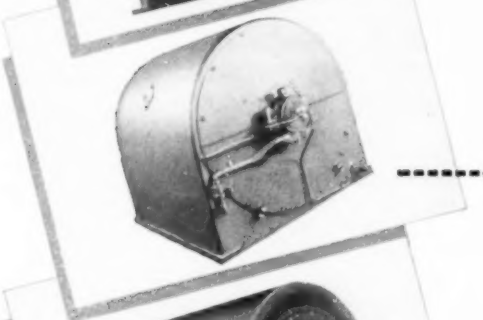
Drip-Proof or Splash-Proof

In many cases, drip-proof or splash-proof motors can readily be used for refinery power-plant auxiliaries, crude oil pumping, and similar applications. Designs based on half a century of motor building experience assure dependability and durability. For detailed information, ask for Bulletins 05B7542 and 51B7693; for two-pole motors 900 hp and larger, get Bulletin 05B7550.



Weather-Protected

Wherever open ventilation is permissible, weather-protected motors can be used. And they can be used outdoors in any kind of weather — rain, snow, sleet, or blowing dust and sand. Special tests with sand and water driven at 75 mph proved that these motors need no housing. Yet they cost little more than indoor splash-proof machines. Ask for Bulletin 05R7874.



Enclosed Forced-Ventilated

Here's a design developed especially for pipeline-station pump and compressor drives. Protection for these hazardous locations is provided by supplying the ventilating air under pressure. The motors cost little more than open designs, and enclosed design minimizes maintenance. Construction of basic motor components is the same as in standard open machines.

Totally-Enclosed Fan-Cooled

For maximum motor protection, specify Allis-Chalmers *tube-type* TEFC or explosion-proof motors. They offer complete enclosure of electrical parts, self-cleaning action and full internal air circulation. Time-proved design permits ratings up to 3000 hp and larger. Underwriters' labels up to 800 hp at 3600 rpm. Ratings and construction details are given in Bulletins 51B7149 and 05B7150.

For more information or for engineering assistance, call in your nearby A-C representative. Or write for the descriptive bulletins listed above. Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-4063

ONLY $246 BUYS A PACKAGE OF FULLY AUTOMATIC FIRE PROTECTION

Anyone who can measure volume . . . and can cut pipe . . . can install this ready-made fully automatic fire extinguishing system that requires no power source.

It includes Kidde's split-second rate-of-temperature-rise heat detector (the fastest detection known to the fire-fighting industry), Kidde's powerful Multijet nozzle and a 50-pound cylinder of fire-killing carbon dioxide. You even get a monometer tester. Pipe and fittings are optional.

Six Kidde Standard Paks are available for volumes from 800 up to 6,000 cubic feet.

All components of Kidde Standard Paks are the same as those used in Kidde custom-designed installations. The difference is that Kidde has pre-engineered the Paks for small hazards. And the savings on volume distribution are passed on to you!

You just can't beat Kidde Standard Paks for inexpensive night-and-day protection against normal flammable liquid hazards.

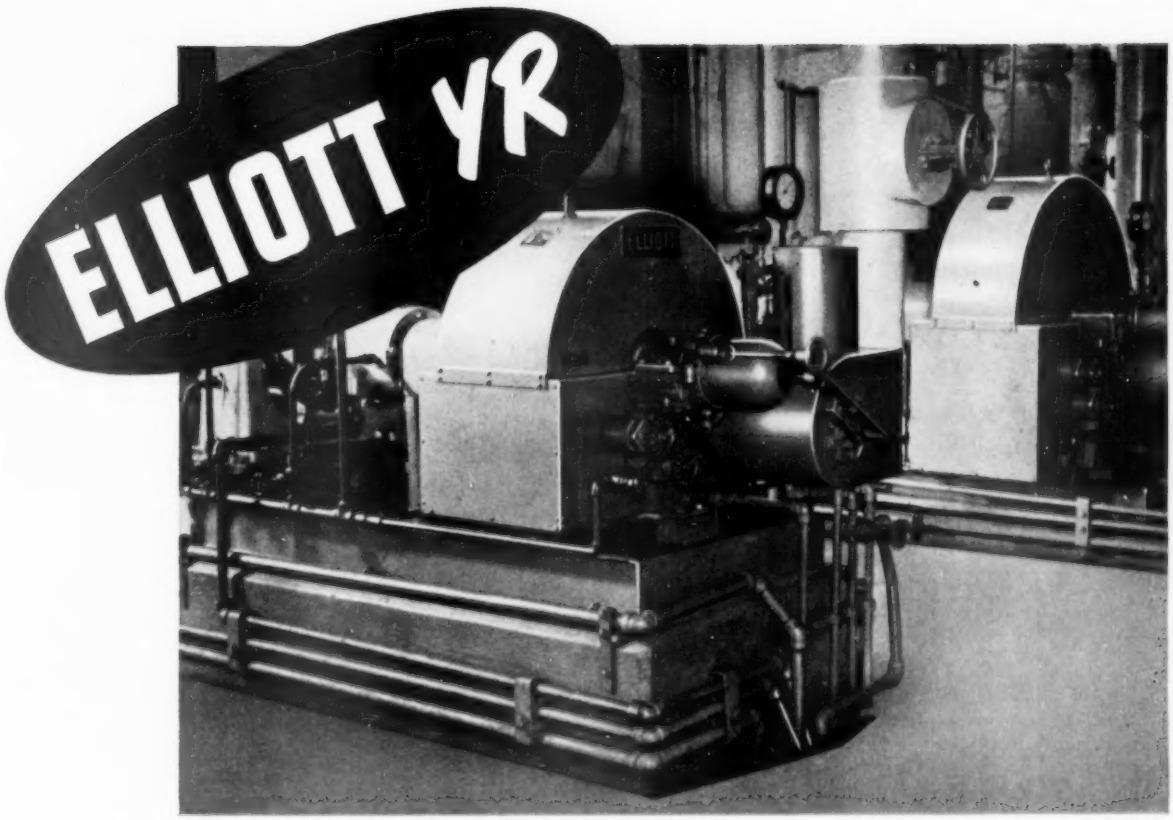
Remember, fire won't wait till you're ready. Better write today for full information.

Kidde

Walter Kidde & Company, Inc.

654 Main St., Belleville 9, N. J.

Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.



the Turbine that has everything!

1. **ADAPTABILITY** — Permissible modifications to standard basic design cover the widest possible range. Actually, eight types of turbines are available on five frames . . . one basic design of governor valve, six elective types of governor . . . several types of speed changer, emergency tripping mechanisms . . . gland seal arrangement for condensing operation and for operation with gas . . . These are just a few of the many available modifications.

2. **RELIABILITY** — Well known as a quality of Elliott turbines, has been further enhanced by improving manufacturing facilities and details of design.

3. **ECONOMY** — First, in the operating saving of a turbine practically built for its specific conditions. Second, in stocking fewer replacement parts due to the interchangeability of wearing parts on all frame sizes.

4. **REPUTATION** — Engineers all know it. As one engineer said to another who had been having drive troubles, "Why don't you put in Elliott turbines and stop worrying?" We can ask for no stronger recommendation.

Write us for informative Bulletin H-16

ELLIOTT Company **STEAM TURBINE DEPT., JEANNETTE, PA.**

Plants at: JEANNETTE, PA. • RIDGWAY, PA.
AMPERE, N. J. • SPRINGFIELD, O. • NEWARK, N. J.

H2-1

DISTRICT OFFICES IN PRINCIPAL CITIES

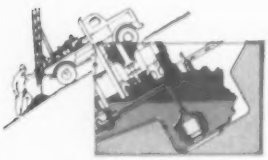
Fully Compensated Drive
—Multiple, free-acting differentials compensate for the differences in travel of all wheels. This reduces drive line strains, eliminates needless tire wear and scuffing.

Proper Weight Distribution
—Only a true 4x4 or 6x6 can give you the added weight on the front wheels needed for necessary traction to work in any footing, terrain, or weather.

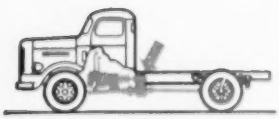
It's features like these that make FWD trucks

basically right for oil men!

There's an FWD for Every Job
—FWD models for Geophysical work, from the Light-Duty LD to heavy-duty 6x6 transporters, are dependable units, designed for rugged oil field service.



High Climb Oil Sump
—Keeps oil pump constantly submerged. Valuable in Geophysical service—prevents "oil starvation" of engine. An exclusive FWD feature that allows truck or truck-operated tools to work on steepest inclines or slopes.



Auxiliary Transmission
—Doubles the number of gear ratios...provides extra low gear ratios for work at extreme low speed. Available on all FWDs, as optional or standard equipment.

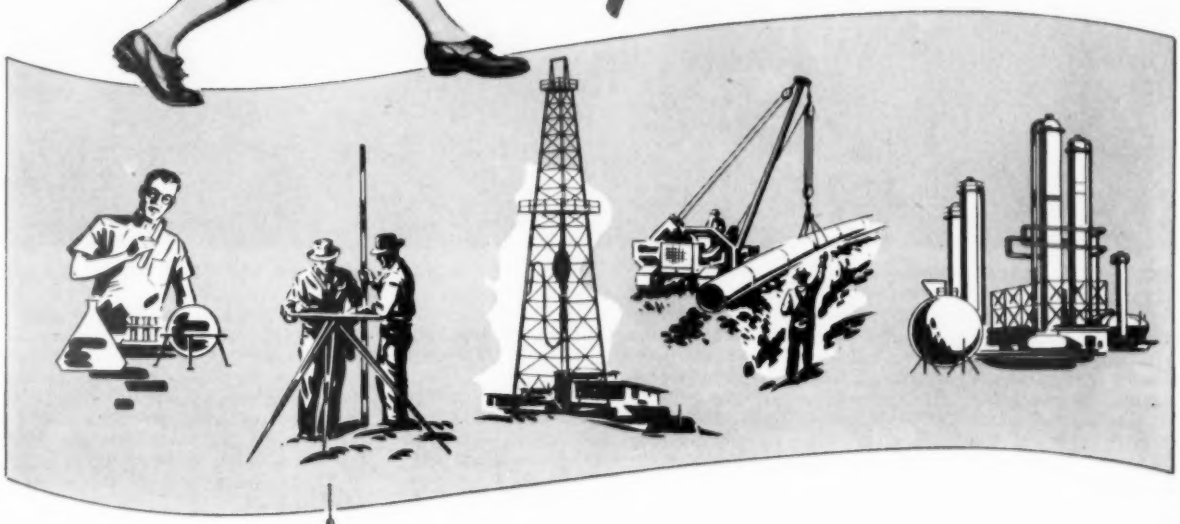
Get More Work Done At Less Cost Per Job...

Designed with the help of veteran oil men, FWDs have many performance-boosting features. An FWD will get supplies and equipment through where other rigs fail . . . handle more work per day, more jobs per year . . . cost less to service and maintain. Your FWD Dealer will be happy to give you all the facts on these versatile tools. Contact him or write direct to FWD. THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wis. *Canadian Factory,* Kitchener, Ontario.

Built by the makers of America's Foremost Heavy-Duty Trucks

TEAMWORK MAKES PRODUCTION

"Pay Off"

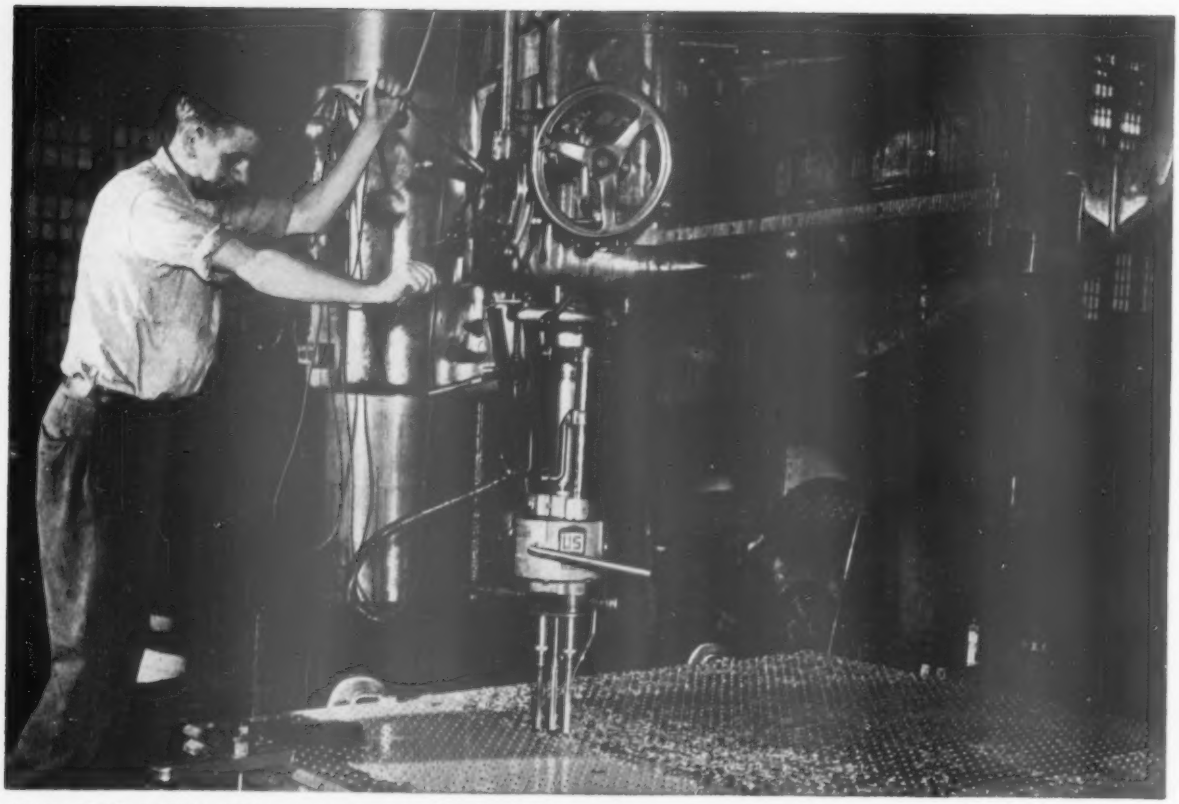


It takes teamwork among land men, seismograph crews and drilling contractors to get production... teamwork among pipeline companies, refiners and marketers to make it pay off. And as every company, major or independent knows, adequate financing comes first. Helping you arrive at a workable plan of financing is a "must" among members of our Oil and Gas Department... specialized Mercantile men who work as members of your team to help make production "pay off". Come in and let them show you.

MERCANTILE NATIONAL BANK

at Dallas

Member Federal Deposit Insurance Corporation



EIGHT FOOT RADIAL DRILL at Alco's expanded Dunkirk plant has multiple head for the precision drilling or reaming of several holes simultaneously. Special machines like this, many of them Alco-designed, all of them operated by veteran craftsmen, are an important part of the Alco method of producing economical, effective answers to the toughest of metal-fabricating problems.

ALCO engineers and craftsmen provide...

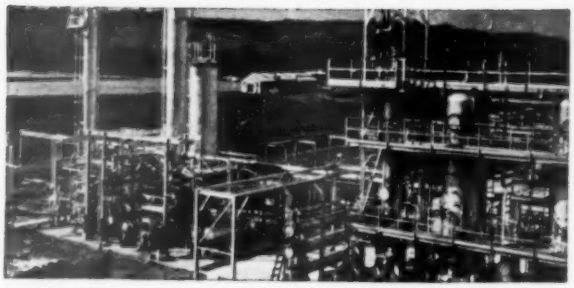
Answers to

Through many years of working closely with engineers of petroleum, chemical, power and manufacturing companies all over the world, Alco has developed economical, effective methods of solving new industrial problems.

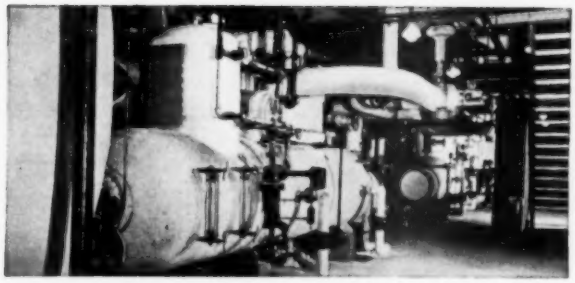
The first step is a thorough exchange of ideas between the client's production engineers and Alco's designers and mechanical engineers. Then, Alco prepares complete design details and fabrication specifications, leaving the client's engineers *free to concentrate on fundamentals.* Finally, veteran Alco craftsmen fabricate the finished product.

Result: substantial savings to the client in original equipment costs and, frequently, in subsequent operating costs.

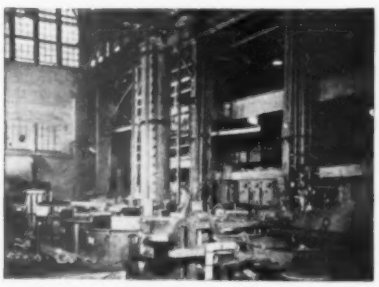
Next time you have a metal-fabricating problem—a problem that calls for specialized equipment or new ways to speed up production—we invite you to let Alco work out the answer. Contact your nearest Alco Products Sales Engineer at New York, Chicago, Los Angeles, Kansas City, Houston, Tulsa, Beaumont, or write direct to Dunkirk, N. Y.



NEW POZA RICA NATURAL GASOLINE PLANT, part of Mexico's growing petroleum industry, uses Alco heat exchangers in many processing steps—plus Alco flash-tower heaters, depropanizer condensers, depropanizer feed heaters, depropanizer bottom coolers and other related units. Operated by Petroleos Mexicanos to meet the needs of Mexico City, the new plant can produce with its Alco equipment approximately 168,000 gallons of natural gasoline per day.

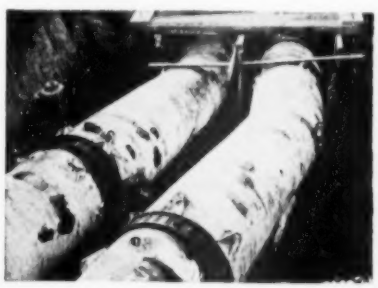


"FLEX-TUBE" EVAPORATORS at the Manila Electric Company's Rockwell Station, Manila, P. I., can produce approximately 5000 pounds per hour net vapor with no more than 1 ppm of impurities when water concentration in the shell is no more than 1500 ppm. With its patented Flex-Tube construction, this unique Alco evaporator offers industry the only positive-acting thermomechanical descaling device for straight tube installation.



NICKEL-PLATED STEEL PIPE for an important project had to be produced to meet a tight schedule and the most exacting specifications. With special production facilities and the concentrated efforts of skilled designers, engineers and craftsmen, Alco met the quality requirements —and made deliveries to the customer on time. Here a 20-ft length, 30-in. in diameter is being lowered into one of Alco's huge vertical plating tanks.

ALCO AIRCOOLERS will handle about 80 per cent of the cooling load at the Celanese Corporation's new chemical plant at Pampa, Texas. Designed to solve the plant's individual problems, they have twin 11-ft fans (one motor-driven, the other vent-gas-turbine driven), removable exchanger heads, tube bundles that slide out on their channel frames, and stainless steel parts wherever the equipment is exposed to process liquids.



TWIN TRUNK MAINS of Alco steel pipe 60 in., 54 in. and 48 in. in diameter, with wall thicknesses of $\frac{1}{2}$ in. and 7/16 in., were installed by the city of Philadelphia to replace smaller cast iron mains. Fabricated on huge bending rolls and welding machines at Alco's Dunkirk plant, they are typical of the many miles of special steel piping furnished by Alco over the years for many of the largest municipal and industrial water supply systems.

New Industrial Problems

ALCO

ALCO PRODUCTS DIVISION

AMERICAN LOCOMOTIVE COMPANY • DUNKIRK, NEW YORK

Hard to choose between 'em?

—not at all!

Where fastest possible drill-out is the prime consideration, take Lane-Wells *Magnesium* Plug, which drills out in 1 to 3 hours. Where extreme differential pressures (up to 10,000 p.s.i.) will prevail, or for permanent installations such as false bottoms or abandonments, choose Lane-Wells *Cast Iron* Plug, which will outlast the casing (it also drills out fast—4 to 6 hours).

Both plugs run easily through fluid, both give leak proof packoff against pressures either up or down, both give positive setting, right where you want it, without creeping, crawling or straining the casing.

Operators who've used 'em say they're tops!

Drillable BRIDGING PLUGS

LANE-WELLS COMPANY

General Offices, Export Office, Plant • 5610 So. Soto St., Los Angeles 58

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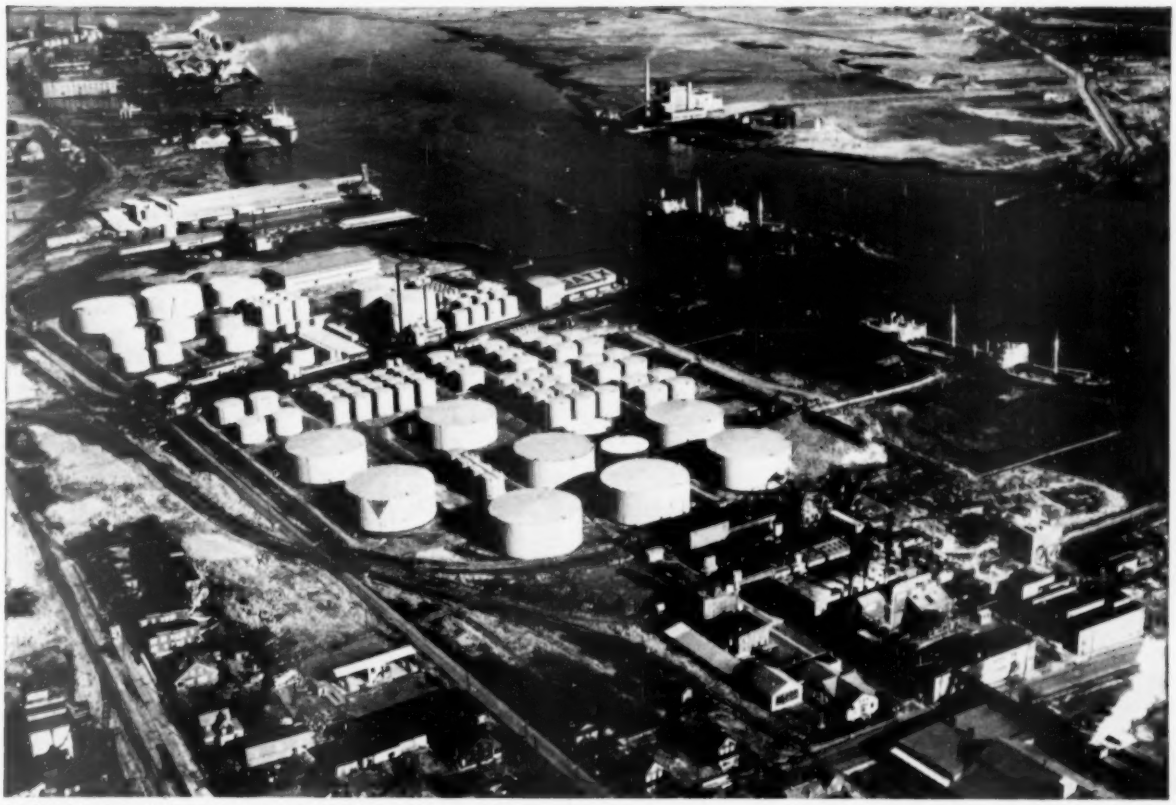
LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA



Tanks of the General American Transportation Corporation's Storage Terminal, Carteret, N. J., after being painted with Light Gray TANKHIDE.

IF IT'S TOUGHNESS AND LONG LIFE YOU WANT—USE PITTSBURGH TANKHIDE

WHEN you're looking for toughness and durability in a finish for gasoline and oil storage tanks, Pittsburgh TANKHIDE gives you what you want.

● **The combination** of special pigments and weather-resistant vehicles makes TANKHIDE an unusually durable, long-lasting metal protective paint. The ability of TANKHIDE to reflect heat prevents excessive losses caused by evaporation. Not only are evaporation losses prevented but TANKHIDE'S original appearance is maintained for a long time by its unique self-cleaning action.

● **TANKHIDE** is designed to hide thoroughly with one coat, whether sprayed or brushed on.

● **For many years TANKHIDE** primers and finishing coats have been used most satisfactorily in all sections of the country to protect millions of tons of iron and steel in structures, equipment and machinery.

● **Besides TANKHIDE,** Pittsburgh also offers a complete line of protective coatings for every need in the petroleum industry—production and refinery finishes for towers, pipe lines, buildings and equipment; service and bulk station paints; pump enamels and drum finishes.

● **Call on us** for expert advisory service. Our wide experience in supplying finishes to the petroleum industry can be helpful and often save you time and money.

• • •

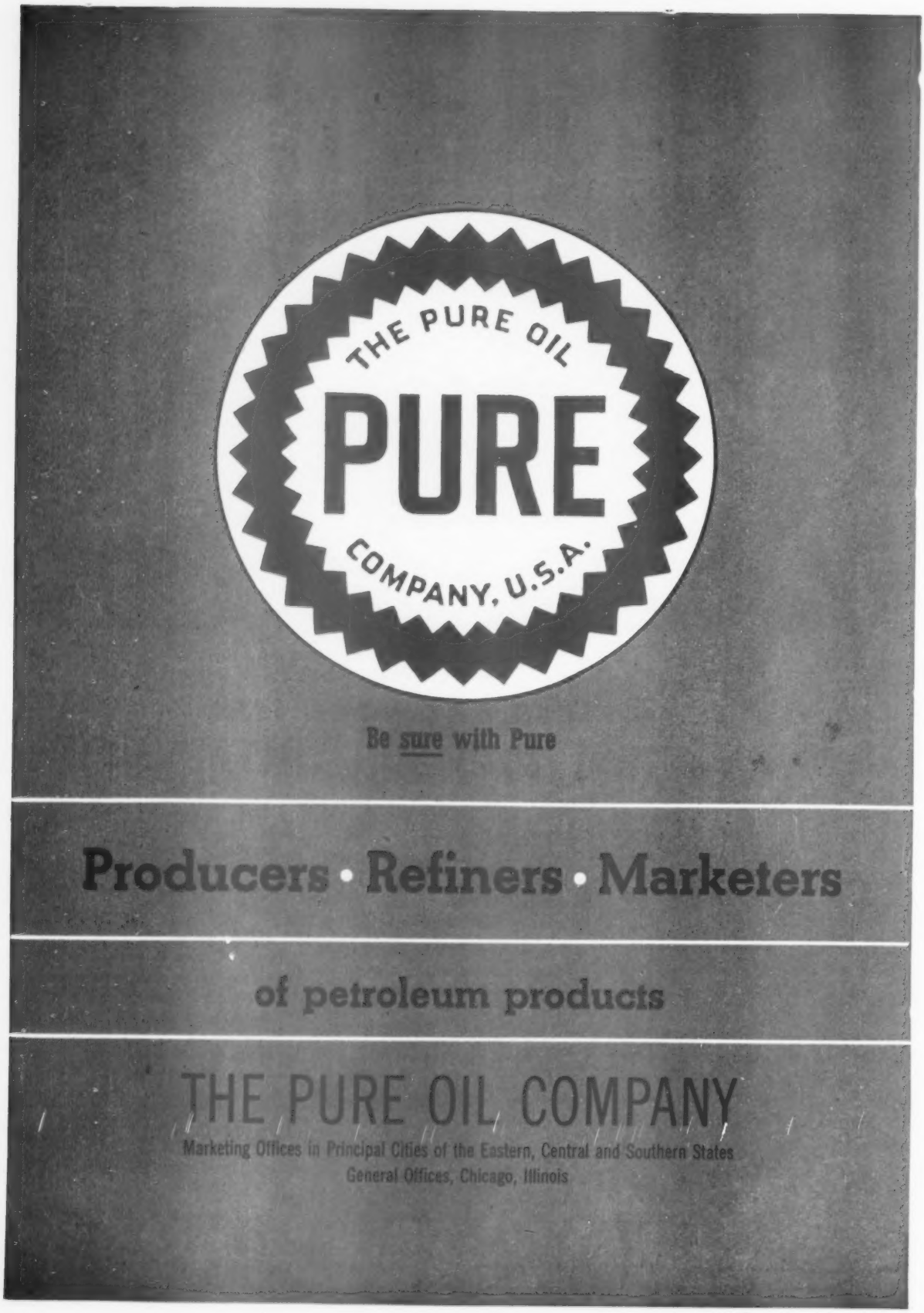
PITTSBURGH PLATE GLASS COMPANY

Industrial Paint Division, Pittsburgh, Pa.
Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pa.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Ditzler Color Division, Detroit, Mich. The Thresher Paint & Varnish Co., Dayton, Ohio. Forbes Finishes Division, Cleveland, Ohio. M. B. Suydam Division, Pittsburgh, Pa.

PITTSBURGH PAINTS

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS • FIBER GLASS

PITTSBURGH PLATE GLASS COMPANY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Be sure with Pure
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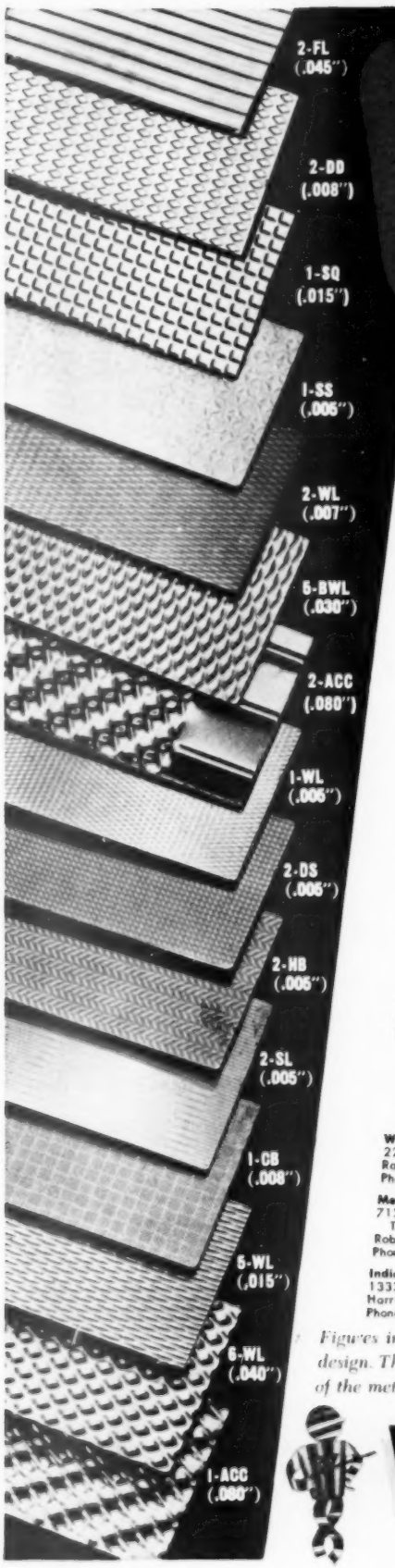

HAVE YOU CONSIDERED USING

RIGID-TEX METAL?

• STRONG • ATTRACTIVE • AVAILABLE

Here is a third-dimensional metal that is going places—*many* places.

If you have an application where appearance is an important factor—or where greater strength at a lighter weight is desired, then you may find Rigid-Tex has a place in your plans, too.

Rigid-Tex utilizes a process for redistributing a smooth metal surface into three-dimensional patterns. The result is a rigid texture which:

1. Conceals scratches, finger prints, scuff marks, and smudges—assuring you an attractive metal surface that retains its appearance long after ordinary metal surfaces have become dingy and marred.
2. Usually reduces metal thicknesses by two full gauges—saving 50% or more of the metal by providing more square or lineal feet per pound.

Rigid-Tex has a non-skid surface, and possesses excellent heat transfer properties. It is ideal for accoustical applications . . . is easy to fabricate and can be bent, soldered, welded, riveted, formed, stamped, drawn, and lock-seamed.

Large sheets can be efficiently and easily handled without the hazards of bulging or distortions.

You will find it profitable to look into the possibilities of Rigid-Tex in your own applications. We'll send literature and samples. No obligation.

Call, wire, or write nearest Metal Goods Corporation Representative:

OFFICES AND WAREHOUSES

St. Louis 15, Missouri
5239 Brown Avenue
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Phone: GOodfellow 1234

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924 State Street
Robert L. Tharp
Phone: 2-3156

Decatur, Illinois
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Arlie W. Tempel
Phone: 8-1314

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1333 N. Pennsylvania
Harry L. Newton
Phone: Lincoln 4980

Beaumont, Texas
238 Bowie Bldg.
Lee T. Dodson
Phone: 4-7536, 4-7537

Fort Worth, Texas
3821 Carolyn
John M. Turbitt
Phone: FOrtune 4369

Corpus Christi, Texas
Room 301-02 Wilson Bldg.
Roy D. Bagaley
Phone: 4-0366

Figures in parentheses, under pattern numbers, indicate approximate maximum depth of each design. These figures, added to the original thickness of the plain metal, give the overall thickness of the metal after rigidizing.

METAL GOODS CORPORATION

Distributors for RIGID-TEX METAL

GENERAL OFFICES: ST. LOUIS 15, MISSOURI

Kindred SIGNS OF THE TIMES:

Pipe, Valves, Fittings,
Tubes, Hose, Rope,
Pumps, Motors, Engines,
Paint, Tools, Special Equipment

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"...here's MY warehouse!"

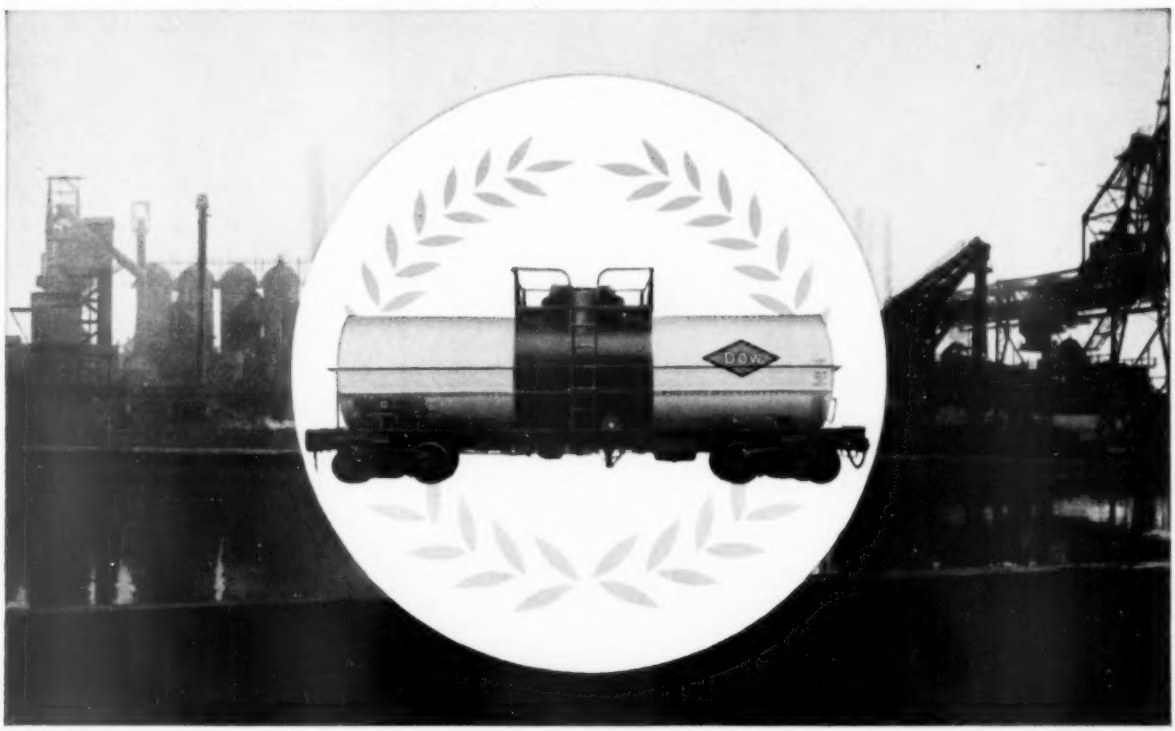
JONES & LAUGHLIN STEEL CORPORATION
SUPPLY DIVISION

J&L STEEL

General Offices: TULSA, OKLAHOMA
88 STORES • 19 OFFICES • 9 RESIDENT SALESMEN
EXPORT: 405 Lexington Ave., New York, N. Y., U. S. A.

DOW CAUSTIC SODA GIVES THE PROCESSING RESULTS YOU WANT

The uniform, high quality of DOW CAUSTIC SODA can be depended upon to greatly benefit your plant operation



Once your processing methods and materials are set, you have to be certain that the standards are maintained to assure the same efficient results every time.

If you use caustic soda, you can benefit your processing operations by ordering from Dow. Dow caustic soda is quality controlled through all stages of production so that you can always depend on consistency of product. The shipment you receive tomorrow, a month from tomorrow, a year from tomorrow will all be uniform, will all produce the same results you require.

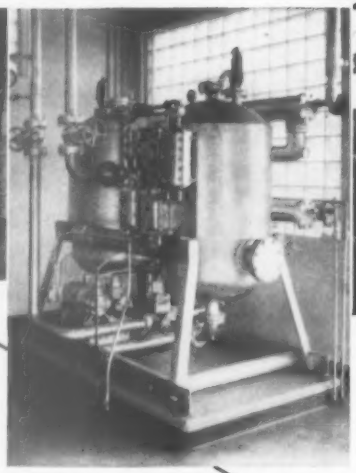
This consistent high quality factor in Dow caustic soda is extremely important to the efficiency of your plant. And, it is the same regardless of what form you buy. Dow can meet your requirements for 71-73% solution, 48-50% solution, solid, flake and ground flake.

The next time you order caustic soda, order from Dow for dependability of product, dependability of service. Dow's famous distribution network will meet your needs wherever you are. Send for the DOW CAUSTIC SODA HANDBOOK, a valuable addition to your files. THE DOW CHEMICAL COMPANY, Midland, Michigan.

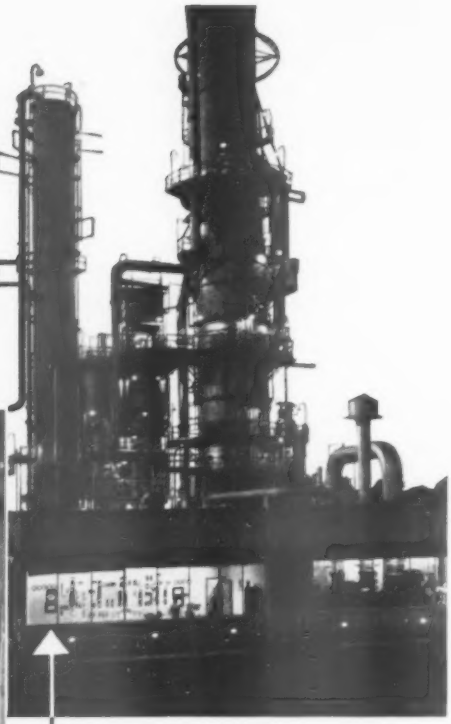
you can depend on DOW CHEMICALS

DOW

Lectrodryer* feeds the nerve center DRY AIR only!



Type BY-5 Lectrodryer provides continuous flow of dried air to panels in control room, protecting vital control instruments and lines against moisture. →



Automatically controlled McMurrey Refinery near Tyler, Texas. One operator in the control room can control and watch over its entire operation.

2300 instruments . . . 900 controllers and valves depend on DRY air to put this giant through its paces automatically. If unwanted moisture were to creep into instrument air at the nerve center, the refinery could be thrown haywire! An instrument line freeze-up, rust, scale or sludge clogging tiny ports could cause a long shutdown.

For 24 hours a day a Lectrodryer feeds the nerve center a constant stream of air dried to a dewpoint of −50° F. Moisture doesn't have a chance!

Lectrodryers catch the moisture which separators and filters let by. Throughout the chemical and petroleum industries they dry air, gases and organic liquids . . . automatically, economically, continuously. For extreme dryness there are Lectrodryers drying down to 3 to 4 parts per million or less.

Whatever the drying need, there's probably a Lectrodryer already built to handle it. Our engineers will help you lay out your system and select proper equipment. Write: Pittsburgh Lectrodryer Corporation, 325 32nd Street, Pittsburgh 30, Pa.

In England: Birlec, Limited, Tyburn Road, Erdington, Birmingham.
In France: Stein et Roubaix, 24 Rue Erlanger, Paris XVI.
In Belgium: S. A. Belge Stein et Roubaix, 320 Rue du Moulin, Bressoux-Liege.

LECTRODRYERS DRY WITH ACTIVATED ALUMINAS

LECTRODRYER

* REGISTERED TRADEMARK U. S. PAT. OFF.

Here's performance you can count on

RCA 2-WAY RADIO

Straight-Forward Circuits to bring your message in without interference—even when you're operating close to an adjacent-channel transmitter.

Automatic Modulation Control to lower loud voices, raise weak voices, to correct level, without distortion.

Long Tube Life for dependable, low-maintenance service. Half the tubes operate at 1/5 maximum ratings.

Full Frequency Range: Fleetfone 30-50 mc, Carfone 152-174 mc.

Fits Anywhere: Transmitter-receiver unit takes no more space than a spare tire, mounts in any position, operates at low drain on 6- or 12-volt battery.

Stable Performance for minimum distortion. Ovenless crystals stay on frequency without warm-up, without wasting stand-by power.

Single-Case Construction for easy tuning and servicing. Offers plenty of protection—makes chassis and all components instantly accessible.

For Extra Dependability, installation and service facilities of the RCA Service Company are available.

* * *

For Complete Details on RCA 2-Way Radio contact the Communications Specialist at your nearest RCA Office or MAIL COUPON NOW.

RADIO CORPORATION of AMERICA

COMMUNICATIONS DIVISION **CAMDEN, N. J.**

Radio Corporation of America
Communications Division
Dept. 89R, Building 15-1
Camden, N. J.

Please send me information on RCA 2-Way Radio
☐ Carfone ☐ Fleetfone
☐ Have RCA Representative call

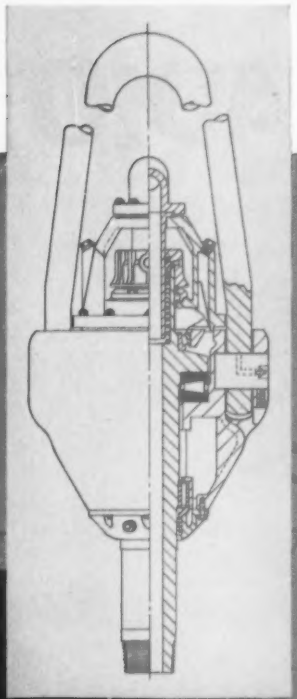
Name_____

Address_____

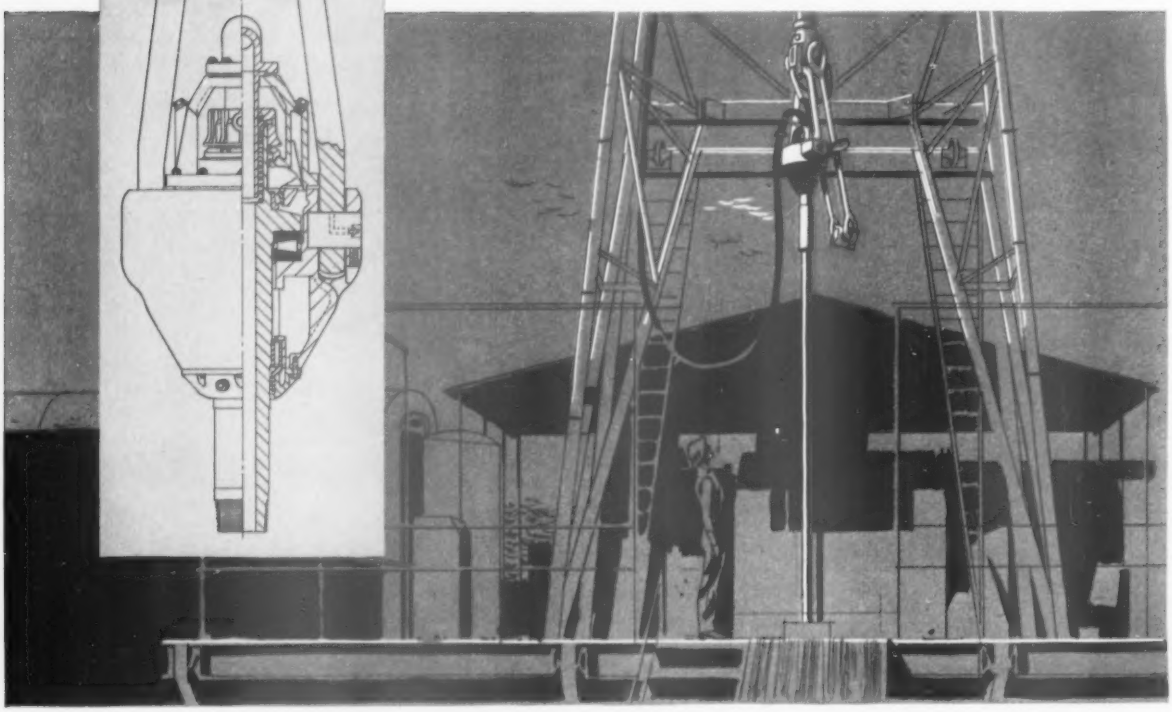
Company_____

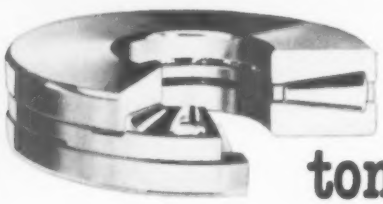
City_____ State_____ Zone_____

TORRINGTON BEARINGS AT WORK



Up to 300 tons of drill string are supported by TORRINGTON Conical Roller Thrust Bearings on the Brewster Model 8-S. TORRINGTON Bearings are also used on Brewster blocks, swivel and rotary tables.





Capacity 300 tons of drill pipe!

The speed and efficiency of your drilling operations literally turn upon the main bearings of your swivels. And those bearings may be called upon to support up to 300 tons of drill string!

TORRINGTON Bearings solve both problems.

Take TORRINGTON Conical Roller Thrust Bearings, for example. These special, heavy-duty bearings are precision-ground from the finest of bearing steels. They are carefully heat treated for maximum load capacity and resistance to wear. The quality of surface finish on both their rollers and raceways is uniformly high.

Thus, like the many other types of TORRINGTON Bearings used in drawworks and slush pumps, crown and traveling blocks, pumping units and rotary tables, Conical Roller Thrust Bearings insure smooth service, long life and minimum maintenance attention.

Specify TORRINGTON Bearings for your equipment! It pays!

THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.

TORRINGTON BEARINGS

Spherical Roller • Needle • Tapered Roller • Straight Roller • Ball • Needle Rollers

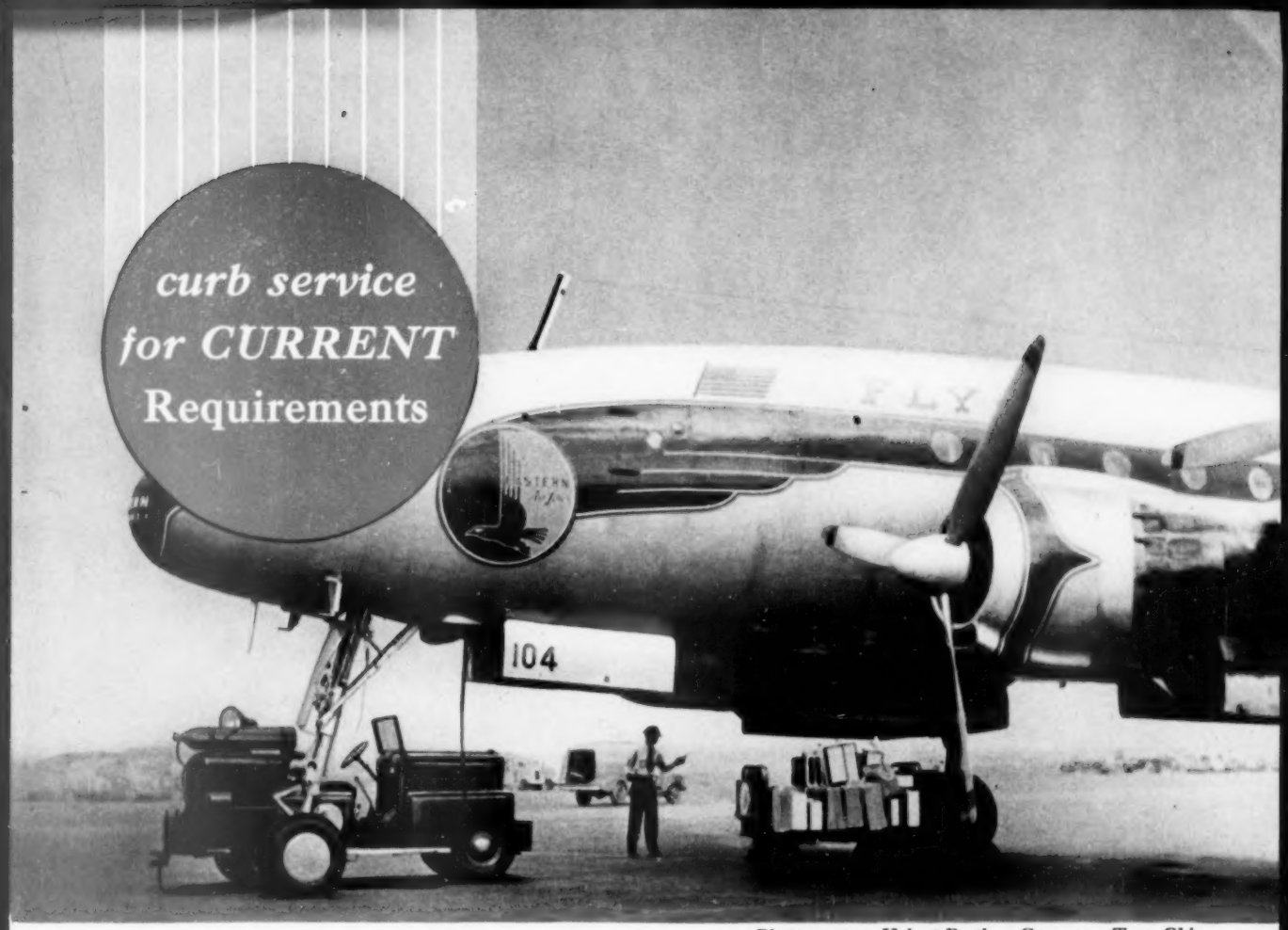
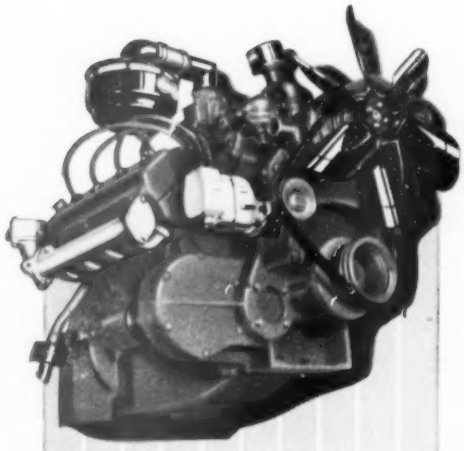


Photo courtesy Hobart Brothers Company, Troy, Ohio

Chrysler horsepower on the ground for added Safety in the Air . . .



The moment the big plane stops and the pilot cuts the engines, the generators, which in flight supply electrical power to the batteries, stop too. But the electrical equipment in the plane—air conditioning, lights, radio, food containers, everything electrical—continue operating off the plane's batteries. Only for a moment, however. In that length of time a self-propelled and self-powered energizer takes over and supplies all necessary current, even starting the plane's engines when it's time to leave.

Among the most popular mobile ground power units are the "Power-Pull" units manufactured by Hobart and powered by Chrysler. The unit pictured uses the mighty 180 horsepower Chrysler V-8 Industrial Engine and can furnish 1000 amperes, 28.5 volts of direct current under continuous operation—enough to handle the electrical load of the largest aircraft. Power from the same engine propels the unit, enabling it to serve also as a towing tractor.

This is another in the long list of important uses of Chrysler Industrial Power. Whether your equipment requires V-8 or Six cylinder engines, Chrysler can supply them with gasoline, propane or natural gas burning carburetor, 3, 4 or 5-speed transmission and other optional equipment.

For your power needs, see a Chrysler Industrial Engine Dealer, or write: ***Dept. 156, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.***

CHRYSLER
Industrial Engines

HORSEPOWER WITH A PEDIGREE

Unaffected even after weeks under water*

UNIBESTOS®

PIPE INSULATION

*UNIBESTOS IS RUGGED, IT STAYS ON THE JOB

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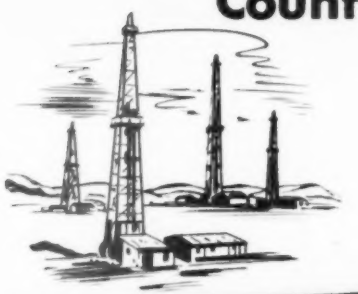
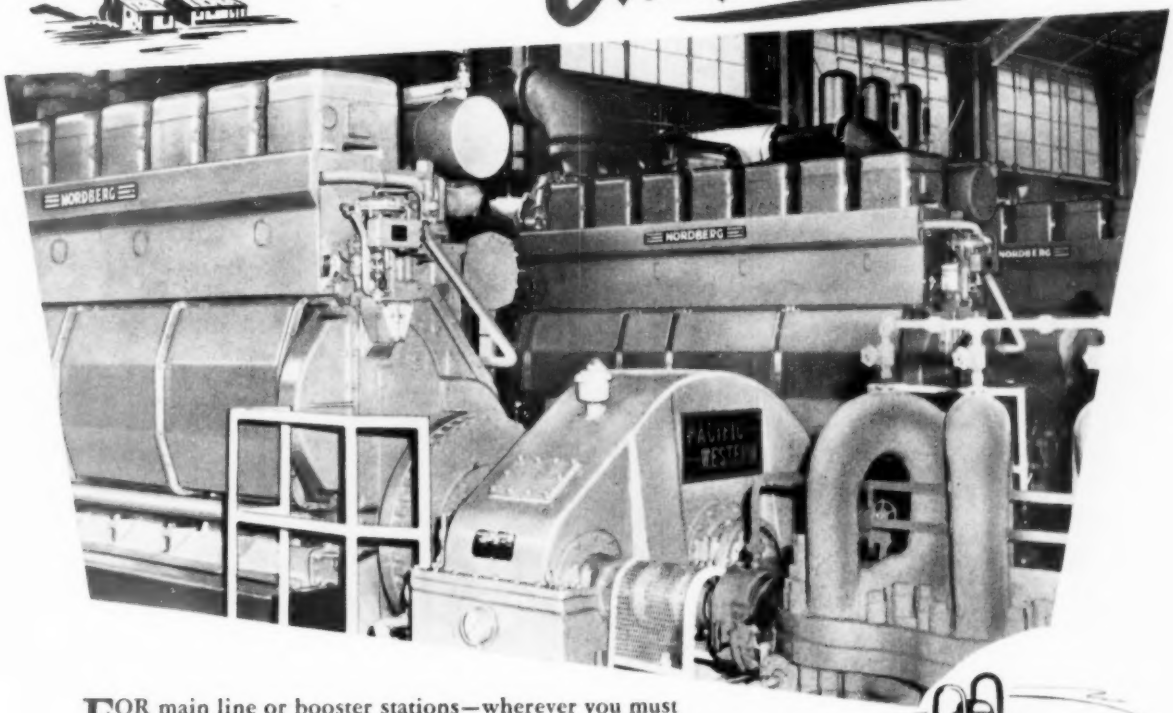
DEPT. E-6, 332 SOUTH MICHIGAN AVENUE, CHICAGO 4, ILLINOIS

Count on NORDBERG ENGINES to keep crude and products "On the move"





FOR main line or booster stations—wherever you must keep crude and products on the move with plenty of power—you can count on Nordberg engines of the right size and type to do a dependable, economical job, day-in, day-out.

Scores of these rugged engines built by Nordberg and its Busch-Sulzer Division have been proved in over 25 years of pipe line service. Applications range from self-contained portable pumping units to permanent stationary installations, and generating units for station power and lighting.

Nordberg engines are available in a wide range of sizes from 10 to over 10,000 hp, including 2 and 4-cycle types, and in Diesel, Duafuel®, and Spark-Fired Gas models. *Write for further details, outlining your power requirements.*

Nordberg Mfg. Co., Milwaukee, Wisconsin

Shown above are three of six 1050 hp Nordberg Duafuel® Engines installed in Richfield pipe line stations in California, designed to operate on natural gas plus Cuyama Crude as pilot oil, on straight Cuyama Crude, or with any proportion of either fuel. Instantaneous conversion from one fuel to another allows the most economical fuel to be used.

NORDBERG

DIESEL • DUAFUEL® AND SPARK-FIRED GAS ENGINES

0251-R2

NO DRILLING OUT OR WAITING WITH

HALLIBURTON'S RETRIEVABLE PACKER

Time becomes an ally when you use this rugged squeeze cementing tool because, just as the name says, it's retrievable. There are no drillable packers involved. There is nothing to drill out.

These factors are responsible for the wide acceptance of Halliburton's Retrievable Packer. The tool not only does the vital squeeze cementing job under varied, difficult downhole conditions, but it saves a lot of your time.

It puts your well back on production much sooner.

Ordinarily out of the hole an hour after cement is placed, the Retrievable is used economically throughout the oil world for repairing casing leaks, controlling water, correcting channeling, re-cementing liners, and other important remedial squeeze jobs.

Halliburton's Retrievable is effective. It is a time saver. It will pay you to utilize this tool on your next squeeze cement job.

Phone your nearby Halliburton representative. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN SQUEEZE CEMENTING!

Laying big inch pipe lines fast—a Bechtel specialty—results in early operating revenues. On major lines the difference in timing may represent a very substantial and attractive sum—good reason for talking with Bechtel about your next line.

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BECHTEL CORPORATION

BUILDERS FOR INDUSTRY

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HENRY H. PARIS DISTRIBUTOR Inc.

Manufacturer's Agent - Oil Well and Refinery Supplies

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● As we begin our 25th year of service to the oil industry, each of us takes pleasure in personally expressing our sincere thanks to those whose valued business has made our growth possible.

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H. C. "Lou" BROWN,
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REGINA MARSHALL,
Invoicing Clerk

BERTA WHILLOW,
Stenographer

They Say—

What Business Wants

"The pre-election fears expressed by the critics of business have turned out to be wholly unjustified. We have no evidence of business 'taking over' the Government, or even wanting to do so. There have been no demands to 'turn back the clock' and repeal such things as the Social Security laws.

"Business will be content if we can restore a government of law rather than of men—a government where business operates under established rules, rather than be subjected to the whims and fancies of politically minded individuals."

Henry E. Ford, director of the development department, E. I. du Pont de Nemours & Co., Inc., addressing the Southeastern Conference of the Society for the Advancement of Management, Asheville, N. C.

Public-Relations Problem

"Most of the people with whom we do business are primarily interested in familiar, daily experiences that directly affect their lives. Therefore, it is pretty hard to interest them in how many millions of dollars we have invested in new facilities, and how vital the oil industry is to the national economy. But the service station salesman at the corner—who knows folks by name when they drive in—and the tank truck salesman who serves the farmer—these men are something real.

"Very frequently we are so busy trying to find a new product outlet, or land a fat contract, or locate a new oil field, that we require something concrete to remind us that our relations with the public are the most important 'marketing' or 'exploration' projects in our portfolios."

Leonard F. McCollum, president, Continental Oil Co., Houston, addressing the midyear meeting of the American Petroleum Institute Division of Marketing, Dallas.

Wildcats Are Expensive

"No average well costs are available for the entire oil industry, but the average cost to Conoco to drill an exploratory well last year was $125,000. Using this average figure, the cost of finding a reserve of over 50 million barrels becomes $120,000,000.

"This is only the cost to drill the exploratory wells. In addition are the costs of geological and geophysical investigations, purchase of leases and the

NICHOLSON W. O. TRAPS

Cannot Leak Live Steam

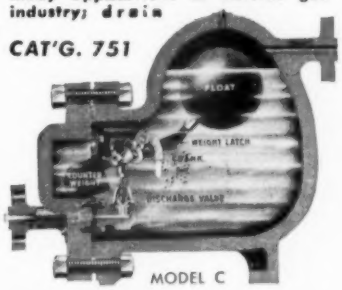
Even though re-evaporation completely dries up its body, a Nicholson weight-operated trap will not leak live steam. Widely used for steam purifiers, super-heated steam lines, headers, separators, heaters, etc.

DRAIN GASOLINE, WATER, OIL

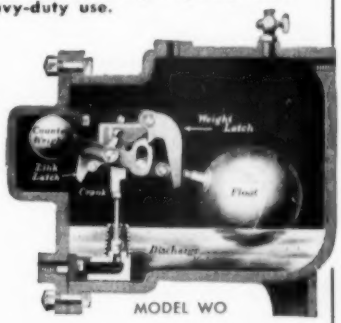
Nicholson W. O. traps also have many applications in natural gas industry; drain gasoline from scrubber head of booster and gas lift compressors; gasoline, oil or moisture from gas well separators, accumulators, after-absorbers, etc.; package natural gasoline plants; gas lines.

4 TYPES—press. to 200, 500, 650, 1500 lbs.; for every large-capacity, heavy-duty use.

CAT'G. 751



MODEL C



MODEL WO

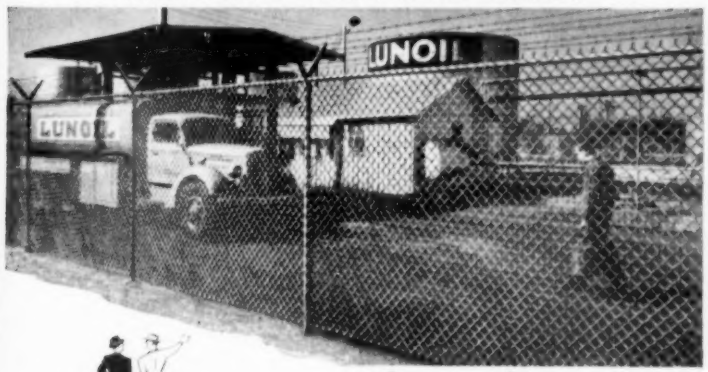
210 Oregon St., Wilkes-Barre, Pa.

W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

PAGE FENCE *-Since 1883*

• AMERICA'S FIRST WIRE FENCE •

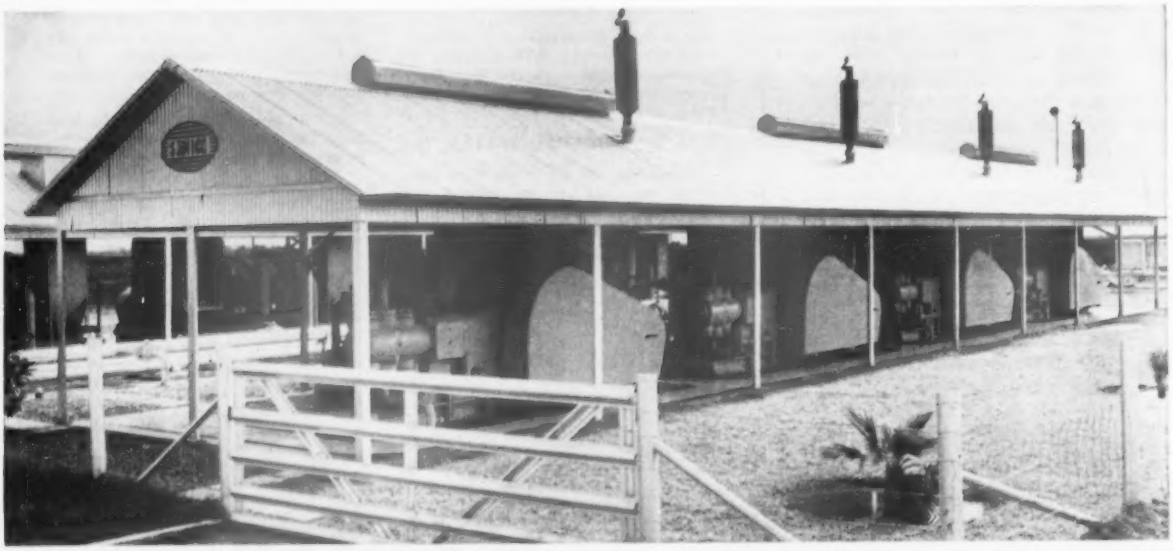


When you think of **hazards** think of PAGE, the pioneer name in fence protection for persons and property. Security is a job for Page Chain Link Fence, available in heavily galvanized Copper-Bearing Steel, rust-immune Stainless Steel or corrosion-resisting Aluminum. But this pioneer name means more than a quality product. It is a complete fence service, performed by more than 100 firms having technical training and fence erection know-how, and conveniently located throughout the country. For Page Fence data and name of firm nearest you—

Write to PAGE FENCE ASSOCIATION in Monessen, Pa., Atlanta, Bridgeport, Chicago, Denver, Detroit, Los Angeles, Philadelphia, New York or San Francisco.

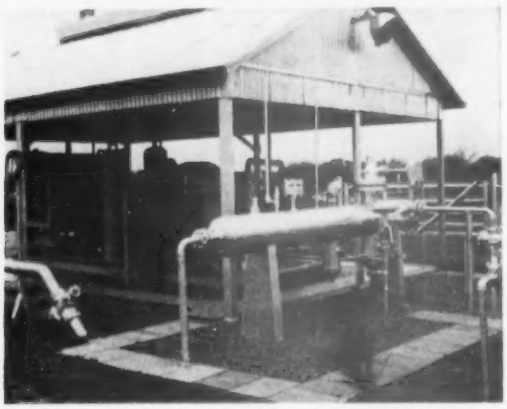
PRODUCT OF PAGE STEEL & WIRE DIVISION OF AMERICAN CHAIN & CABLE COMPANY, INC.

DRIVING Wilson Supply—Ingersoll-Rand Portable COMPRESSORS in Southern Minerals Corp. Southwest Texas RE-PRESSURING PLANT...



WAUKESHA ENGINES

207



(Above) Model 145-GKU, 6-cyl., 5¼-in. x 6-in., 779 cu. in. Waukesha Gas Unit, powering a 3½-in. x 11-in. portable compressor. Maximum horsepower on natural gas, 145 @ 1600.

go 25,000 Hours Without Overhaul

In this plant, where millions of cubic feet of gas are re-pressured for main line transmission, every day Waukesha Gas Power Units are running up remarkable records in continuous service. Of the thirteen Waukeshas driving the plant's portable compressor booster units, several Waukesha Engines have run more than 25,000 hours *without an overhaul!* Two of the thirteen Waukeshas have been overhauled, however—one after 24,552 hours; the other after 20,160 hours. The load is 6-7 inch vacuum three-quarters of the time. Send for Bulletin 1079. *Waukesha Motor Company, Waukesha, Wisconsin; New York, Tulsa, Los Angeles.*

(Below) In major installation, eight 6-WAKU, 6-cyl., 6¼-in. x 6½-in., 1197 cu. in. Waukesha Gas Units power four 9½-in. x 13-in. high stage and four 5¾-in. x 13-in. low stage compressors. Maximum horsepower on natural gas, 202 @ 1500.

drilling of other wells required to produce the oil."

H. H. Hinson, vice president, Continental Oil Co., Houston, addressing an accounting conference at Eastern New Mexico University, Portales.

Why Oil Is Plentiful

"Unlike the electric power industry, our industry has not been subject to competition from government-owned installations. Unlike the railroads, we have not been hamstrung by a multitude of restrictive regulations by the Interstate Commerce Commission. Unlike agriculture, our industry has not had to live under the threat of wide price fluctuations caused by mass purchases and sales of surplus commodities by the federal Government. Petroleum products would not be so plentiful and cheap as they are today except for the fact that the industry has not been over-regulated."

Bruce K. Brown, president of Pan Am Southern Corp., addressing the Kansas City Oil Men's Club.

On Offshore Control

"We still think that all resources beyond low-water mark ought to belong to the people as a whole, but that issue has been settled at least temporarily. It is now up to the Senate to see that the federal Government is permitted to go ahead with the development by private companies of the remaining part of the Continental Shelf contiguous to the coasts of the United States, and to be sole recipient of royalties from the fruits of that development."

Editorial in the New York Times.

New Tariff Law Needed

"A vital step . . . which we as a nation must perform to bring our trade policy into line with the realities of today's world . . . should be the writing of a new and equitable tariff law. We should eliminate the Smoot-Hawley Tariff and the outworn Reciprocal Trade Agreements Act and start over from scratch.

"The new law should allow for adjustments in the rate of reductions to soften the hardship in particular cases, but it should at the same time move the country steadily toward the goal of open competition with all comers.

"The other obvious steps in this readjustment are to wipe out the quotas which put arbitrary and wholly unrealistic limits upon amounts of goods imported into this country, and to streamline customs procedures which, as they stand, offer a baffling and sometimes impervious barrier of red

MAXIMUM THREAD PROTECTION

WECO COMPOUNDS

REGISTERED TRADE MARK

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• LO-TORK has more than 50% finely screened metallic lead, held in solution with a neutral oil and a tacky additive.

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• NO-GALL, with more than 50% pure metallic zinc, increases thread life by providing real thread protection.

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Much of the accuracy of Hycalogging* is the result of taking cuttings samples regularly, every two feet, direct from the flow line. Any stoppage in the lines which bring samples to the logging unit would result in serious loss of evaluation time and incomplete logging.

Hycalog researchers, backed by the experience of logging over 800 wells, have eliminated any danger of stoppage with a unique Hycalog-developed pump and flow system. This system handles any formations without clogging, from unconsolidated sands of the Wilcox in South Texas to the consolidated Cotton Valley Travis peak sands. And no matter what viscosity the fluid, Hycalog gets the cuttings samples regularly.

**Hycalogging is continuous hydro-carbon logging of cuttings, mud samples and recovered cores.*

Every Hycalog unit equipped for:

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tape to those seeking markets in this country.

"Some will say that what I have proposed here would open the floodgates to a deadly deluge of products of slave and sweatshop labor. They may tell you that this rolling, surging tide of cut-rate goods would engulf us and drown our domestic industries and cut our standard of living down to the level of the ox-cart nations. . .

"Always before we have met competition by applying our ingenuity to the development of new methods, new products, new markets; I find no reason to doubt our capacity to go on doing so. . .

"The prosperity that we create by buying abroad will enable new millions of people to buy our products who have never bought them before. The dollars we spend will come flowing back with handsome interest."

T. S. Petersen, president, Standard Oil Co. of California, before the Commerce Club of Seattle University.

Friend of Business

"I have come into the Department of Interior with a firm conviction that the phenomenal success of America is based on individual initiative and on private enterprise; that any system of government which denies these principles is basically unsound.

"I believe, further, that any unnecessary governmental meddling or intervention with the operations of free enterprise does far more harm than good. With such strong convictions I had qualms about entering Government service, but I am happy to say that the Administration of President Eisenhower is dedicated to the same fundamental principles."

F. E. Wormser, Assistant Secretary of the Interior, speaking at the International Petroleum Exposition, Tulsa.

CALENDAR

JUNE

2- 3	American Petroleum Institute, Division of Production, Pacific Coast District, Statler Hotel, Los Angeles
4- 5	Kentucky Oil and Gas Association annual meeting, Lafayette Hotel Lexington, Ky.
7-12	Society of Automotive Engineers, summer meeting, The Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J.
14-18	Canadian Gas Association, Windsor Hotel, Montreal, Canada.
15-19	American Institute of Electrical Engineers, summer general meeting, Chalfonte-Haddon Hall, Atlantic City.
15-19	American Association for the Advancement of Science, petroleum conference, Colby Junior College, New London, N. H.
15-19	American Petroleum Institute, Division of Production, midyear com-

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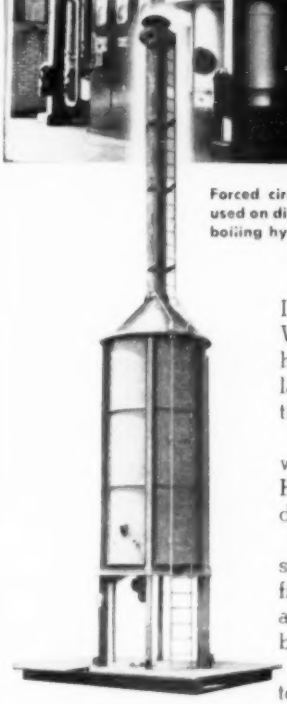
STRUTHERS WELLS

FIRED HEATERS

FOR ▶ Rich Oil Heating for Gasoline Plant Service • Indirect Heating for Grease Kettles • Steam Superheating • High Temperature Gas Heating • Dehydration Equipment • Petrochemicals • Asphalt Heating

Forced circulation Dowtherm heating unit, used on distillation equipment in which high boiling hydrocarbons are handled.



Shop assembled oil heater used for indirect heating of grease kettles, at plant of a leading oil company.

Illustrated are a few of many uses of Struthers Wells direct fired heaters. Where indirect heating is used with these heaters, the circulating medium may be oil or Dowtherm, with the Dowtherm used in vapor or liquid phase.

Heating systems may be supplied complete with all instruments, controls and burners. High thermal efficiencies may be secured, if desired, using finned tube convection surface.

Heaters to about 10,000,000 Btu may be shipped completely assembled and ready for field erection, except for structural platforms and stacks. Larger units are field assembled, but require a relatively small amount of labor. *Quick deliveries* are available in an extensive line of standard sizes.

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WHITE-ROTH *Machine Corp.* LORAIN, OHIO

mittee conference, Hotel William Penn, Pittsburgh.

16-19 American Welding Society, national spring technical meeting, Shamrock Hotel, Houston.

JUNE 16-JULY 2 Intensive Course and Research Conference on Phase Behavior of the Hydrocarbons, University of Michigan, College of Engineering, Ann Arbor.

18-19 Western Petroleum Refiners Association, regional technical-industrial relations meeting, Conrad Hilton Hotel, Chicago.

18-19 Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh.

18-20 National Society of Professional Engineers, annual meeting, Sheraton-Beach Hotel, Daytona Beach, Fla.

24-27 Intermountain Association of Petroleum Geologists, fourth annual field conference, Ben Lomond Hotel, Ogden, Utah.

June 28-July 2 Petroleum Equipment Suppliers Association, annual meeting, Broadmoor Hotel, Colorado Springs, Colo.

JUNE 29-JULY 3 American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

JULY

July 30-Aug. 1 Wyoming Geological Association, eighth annual field conference, University of Wyoming, Laramie.

AUG.

17-19 Society of Automotive Engineers, international West Coast meeting, Georgia Hotel, Vancouver, B. C., Canada.

18-21 American Institute of Electrical Engineers, Vancouver Hotel, Vancouver, B. C.

24-26 Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, Va.

SEPT.

6-11 American Chemical Society, national meeting, Conrad Hilton Hotel, Chicago.

9-11 Pacific Coast Gas Association, San Francisco.

11-12 Association of Desk and Derrick Clubs of North America, annual meeting, Cosmopolitan Hotel, Denver.

13-16 American Institute of Chemical Engineers, Fairmont and Mark Hopkins Hotels, San Francisco.

15-16 American Petroleum Institute, executive committee, Greenbrier Hotel, White Sulphur Springs, W. Va.

16-18 National Petroleum Association, annual meeting, Hotel Traymore, Atlantic City, N. J.

21-25 Instrument Society of America, national instrument conference and exhibit, Sherman and Morrison hotels, Chicago.

24-25 Western Petroleum Refiners Association, regional meeting, Henning Hotel, Casper.

27-30 American Society of Mechanical Engineers, annual conference, petroleum division, Rice Hotel, Houston.

28-29 Independent Natural Gas Association of America, Shamrock Hotel, Houston.

Sept. 30-Oct. 2 American Association of Petroleum Geologists, Mid-Continent regional meeting, Masonic Building, Wichita.

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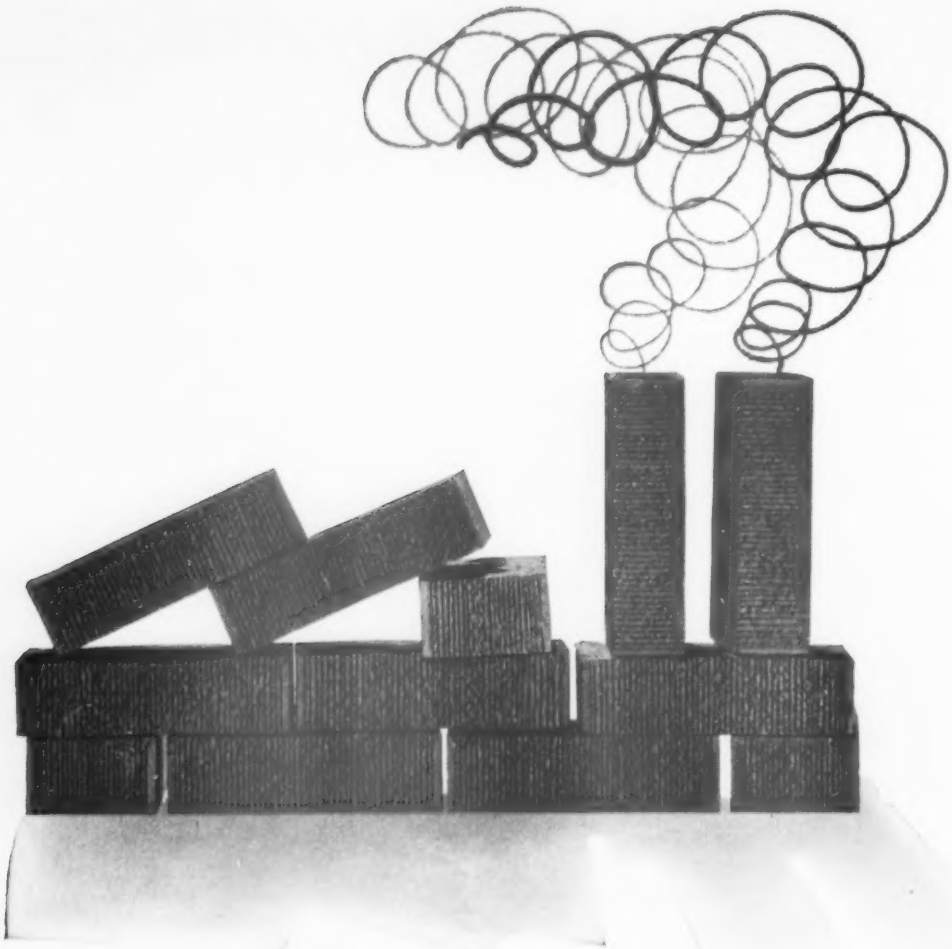

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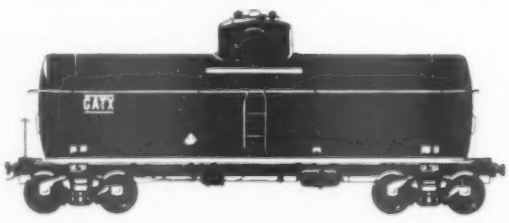
to carry your bulk liquids



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TULSA, OKLAHOMA

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JOURNALLY Speaking

Long Live the Queen

ENGLAND is crowning a queen this week, and some of the news items about the event illustrate the mixture of the old and the new which is so characteristic of many things British and so strange to Americans who can't slough off old things fast enough.

For instance there is the matter of transportation. When Americans inaugurated a new president a few months ago the official party was transported in the latest model high-powered car. But Elizabeth II is riding to her coronation in the same identical coach that British monarchs have used since before the U.S.A. was even a gleam in the eyes of a few rebellious colonists.

According to the National Geographic Society, our authority on such matters, the royal coach of state is an ornate, gilded, 4-ton vehicle pulled by eight gray horses, complete with outriders, which was built for George III in 1761. Instead of springs it is suspended by long leather straps, which caused Queen Victoria to complain that it had a "disagreeable oscillation" similar to that experienced in crossing the English Channel on a choppy day.

The coach is used not because the petroleum age hasn't caught up with England nor because the royal family can't afford to trade the old buggy in on a '53 model. The fact is that Elizabeth drives her own car (something our Secret Service won't let our presidents do), and her royal consort, Duke Philip, is an ardent sports-car fan. The coach is used because —well, because it's still around and has some wear left in it, and because it's done, don't you know.

Another example is the royal haberdashery. In the same week we ran across two pieces of news. Oil men visiting the International Petroleum Exposition cleaned out Tulsa clothing stores of all wearing apparel made out of any petrochemical fiber—the very latest marvel of science and boon to writers of clothing advertisements. But over in England the young queen was being fitted for her coronation robe of royal velvet made from silk painfully raised right on the Tight Little Isle—the product of a long-standing attempt to introduce the mulberry-tree-and-silkworm industry there.

Here again it's not that petrochemistry is unknown or unappreciated in the British Isles. For all we know Her Majesty may wear some petrochemical unmentionables under her worm-spun velvet. It's just that the British, being British, refuse to let an upstart like petrochemistry crowd out the ancient art of sericulture (silk raising, to you).

But don't let this adherence to tradition fool you. Petroleum is making rapid progress in England, as will be attested by any American exporter of petroleum products.

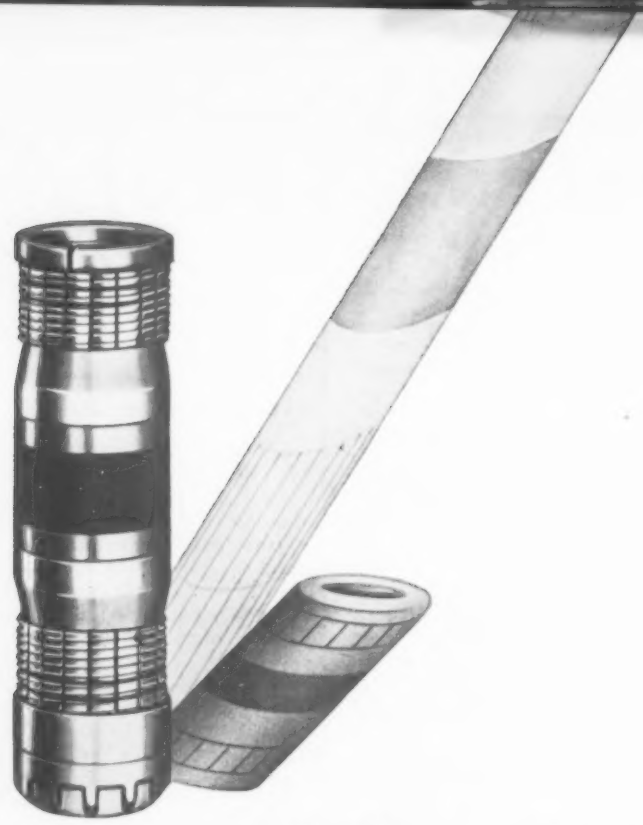
Texas Vacancies

SOME big lawsuits are now going on in Texas over vacancies in Spraberry field. Vacancies are old stuff to Texas oil men, but for the benefit of non-Texans an explanation may be in order.

First, it should be understood, everything is done differently in Texas. This applies to land surveys. Being rugged individualists and traditionally opposed to government paternalism, Texans did not set up a system of official surveys and bench marks back in the early days. Texas had so much unoccupied land it could afford to be prodigal with it and almost everybody, even including (oh for shame) some Texans, thought it wasn't worth much. So when somebody got a big grant of land or bought a tract for two bits an acre out in Texas' wide-open spaces he had to locate it and survey it himself. Since individual enterprise prevailed, he was free to use any method that suited him, without conformance with any government restrictions.

As a result there are many narrow strips and odd corners which have never been included in any survey, so are "vacancies." And when it looks as though one of these might be valuable for oil, the children of lawyers and surveyors are kept in shoes and landmen have a perpetual headache.

Henry D. Ralph



here's the long ...and the short

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Federal control moves to the well head

FEDERAL regulation of gas production is closer than it ever has been. The circuit court decision in the case of Phillips Petroleum Co. is far more than just another in the long series of court decisions inching the Federal Power Commission toward regulation of field prices of gas.

Its language and the circumstances behind it make it virtually a mandate to the FPC to set well-head prices for gas, including gas produced with oil, and to regulate the rates and practices of natural-gasoline plants and other gas processors wherever any of the gas eventually enters an interstate pipe line.

There seems to be faint chance that the Supreme Court, in the light of its other decisions skirting this issue, will flatly reverse the decision. Nor can the personnel of the FPC do much about it at this late date. The remedy lies with Congress.

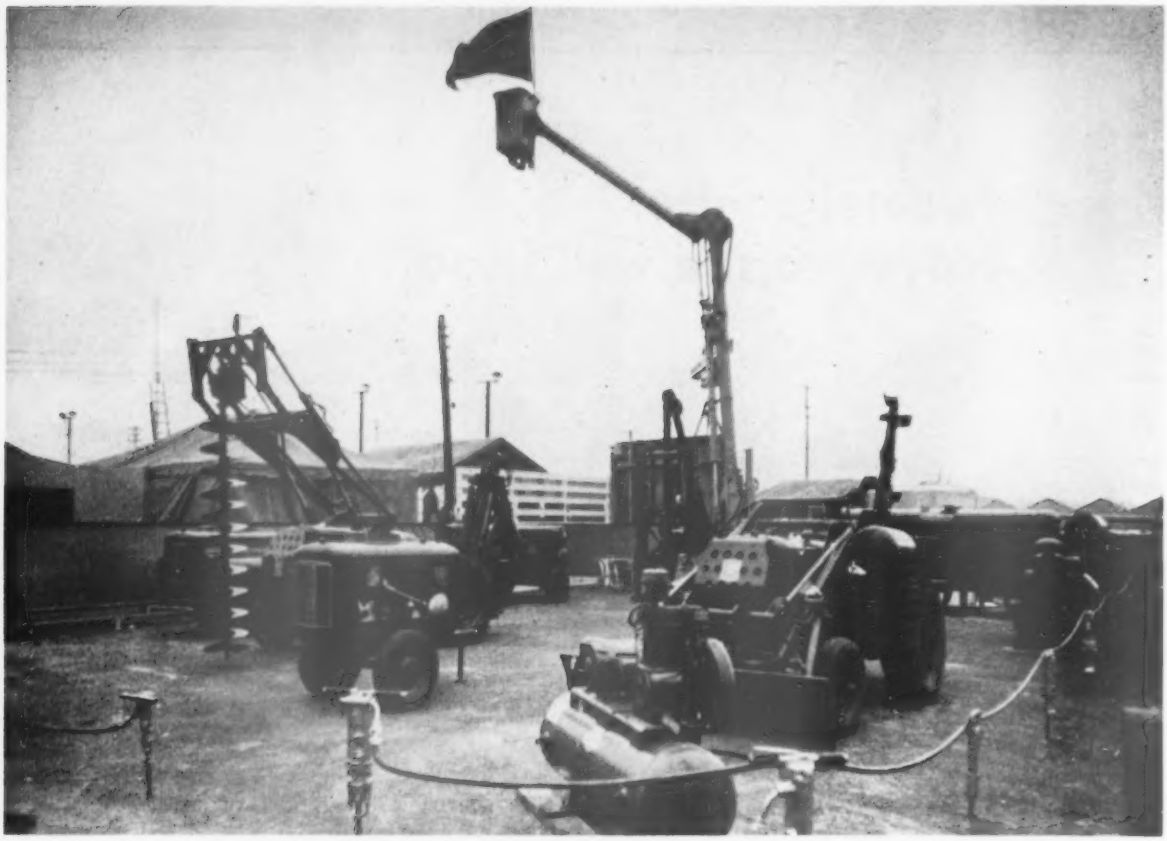
THERE is little use adding to the millions of words already heard in courts and Congress about the exemption of production and gathering as stated in the present law. The circuit court says that any sale of gas for resale in interstate commerce is not a part of gathering but is subject to regulation. Another attempt must be made to write a new law which is clear and workable.

But such attempts have failed in the past and the task will be harder now. Demagogs have made consumers believe that lack of federal regulation of well-head prices causes high gas rates, and the current movement to lessen federal controls in many areas is subject to political attack as a "give-away program." This matter of life and death to gas producers has become a national political football.

Every gas producer and processor knows that the business cannot prosper and expand—might not even long exist—if regulated from Washington like a public utility. The FPC admits that its type of regulation is not applicable to oil and gas production, will stifle exploration, and will interfere with state conservation authority. This is so obvious to oil men that they have difficult realizing that it is not understood by the general public.

THIS situation calls for some astute work by the industry. Corrective legislation cannot be bulled through Congress by force. The groundwork must be laid by a long, patient, and costly campaign of public education.

Gas consumers and their political champions must be shown that they will have little gas to fight over unless production, gathering, and field processing are kept free from federal price fixing.



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We hope you were one of the many thousands privileged to see this exhibit. For those who were not, or for those who desire further information, please write to . . .

SCHRAMM, INC.

The Compressor People

WEST CHESTER • PENNSYLVANIA

THIS WEEK

LIGHT DAWNS for offshore oil operations with two new laws defining state and federal administrative zones in the marginal sea. This Magnolia Petroleum Co. well is in the federal zone of the Continental Shelf, 25 miles off the coast of St. Mary's Parish, Louisiana, and 65 miles south of Morgan City. It has been producing since 1950 despite the controversy which stopped development work.

PIPE LINES.—Service lets contract for 160-mile crude line to move crude from North Dakota's Tioga and Beaver Lodge fields to Indiana Standard's Mandan refinery, under construction. . . . ¶Texas Supreme Court asked to reconsider decision upholding natural-gas gathering tax on pipeline firms. . . . ¶Northern Natural, Permian Basin let contracts for 539 miles of line for system which will move residue gas from plants in Spraberry Trend. . . . ¶Salt Lake Pipe Line awards contract for 135-mile products line from Pasco, Wash., to Spokane. . . . ¶Texas Illinois Natural under way on project to increase capacity of Hungerford-Joliet gas artery. . . .

TRENDS.—Announced allowables indicate crude production in June of about 6,425,000 bbl. daily. . . . If crude imports remain near current levels, new crude supply will average about 7,100,000 bbl. daily. . . . Allowing for normal crude exports and transfers, crude stocks will increase if refinery runs average less than 7,010,000 bbl. daily. . . .

ACTIVITY.—Crude production averaged 6,346,950 bbl. daily for week ended May 23, up 16,200 bbl. daily. . . . Total well completions for the week increased 14 wells to 969. . . . Wildcat completions totaled 217 wells compared with 232 for previous week and 210 for same week last year. . . . Rotary rigs operating in United States decreased 35 rigs for week ended May 25 to 2,531. . . .

INTERNATIONAL.—Anglo-Iranian stymied a second time in its drive to halt flow of Iranian oil exports. . . . Japanese court refuses to grant injunction stopping sale of the first cargo of crude shipped into Japan, holding that it lacks authority to pass on the legality of the Iranian nationalization law. . . . ¶Turkish Government confirms previous reports that it has engaged Max Ball to write new petroleum law permitting private capital to participate in oil exploration and development in the country. . . . ¶Southern California Petroleum Corp. contracts with International Egyptian Oil to direct exploration and development on the latter's concession on the Sinai Peninsula in Egypt. . . .

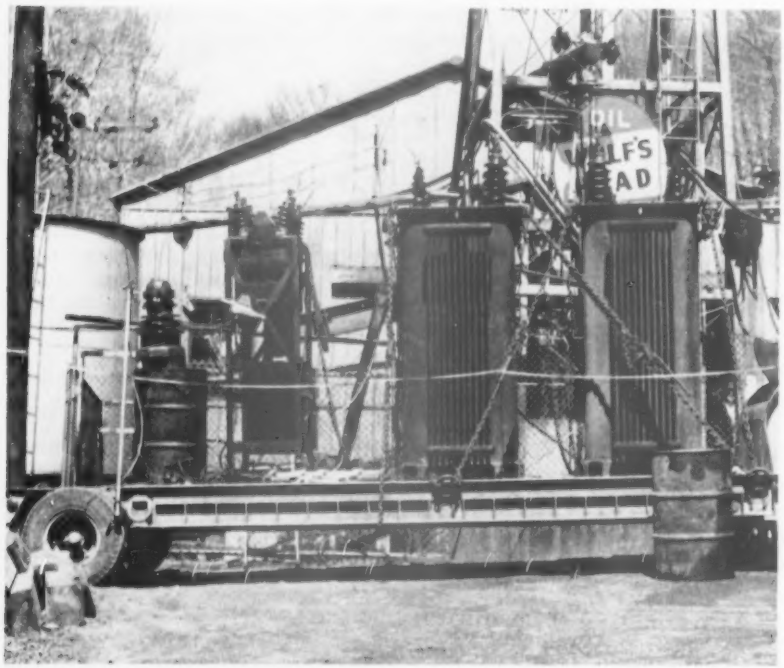
GOVERNMENT.—Eisenhower's signature on bill ends 20-year dispute over ownership of lands seaward from low-tide mark. . . . Legislation now being studied by Senate committee which would provide procedures for issuing leases on Continental Shelf beyond state boundaries. . . . ¶Court of Appeals reverses FPC ruling that Phillips is not a natural-gas company within the meaning of the Natural Gas Act. . . . Only way to prevent some 2,000 other companies from coming under FPC regulations is seen in possible Supreme Court reversal or new legislation by Congress. . . .

EXPLORATION.—Ohio Oil Co. breaks California's drilling-depth record with Kern County wildcat testing the Eocene. . . . Well passes previous record of 18,734 ft. . . . ¶Observers consider it possible the test will also break world's depth record of 20,521 ft. . . . ¶Ruling expected soon from Interior Department on exploration work in Santa Ynez Valley watershed in California. . . . Industry claims barring of exploration work in 330,000 acres is unnecessary to prevent pollution, fires, and erosion. . . .

PETROCHEMICALS.—Warren Petroleum to enter field with new plant on Houston Ship Channel. . . . New plant will produce pentaerythritol, methyl alcohol, acetaldehyde, and other chemicals from butane and/or propane using improved hydrocarbon oxidation process. . . . Eastman Kodak affirms its intention to build polyethylene plant at Longview, Tex. . . .

New Fracturing Method Tested

1 **OIL-SAND HOT FOOT originates with this insulated wire cable coming from cross-arm high-voltage supply. The cable goes down to the oil sand through 6¼-in. casing. The suspended circular current transformer provides current leads for the ammeter and wattmeter (See photo 3). The potential transformer provides voltage leads for the wattmeter and the voltmeter.**



2 **HIGH-VOLTAGE EQUIPMENT employed in electrofracturing test. On the wood post at left is the cross bar with the 11-KV line coming from the substation. Next important equipment from left is the oil circuit breaker, supported by steel frame stand. It was set to protect the substation located a mile away. The two 450-KVA transformers are set back to back so as to maintain adequate voltage control to the load, the First Venango sand.**

Electricity used in attempt to fracture sand, induce oil flow

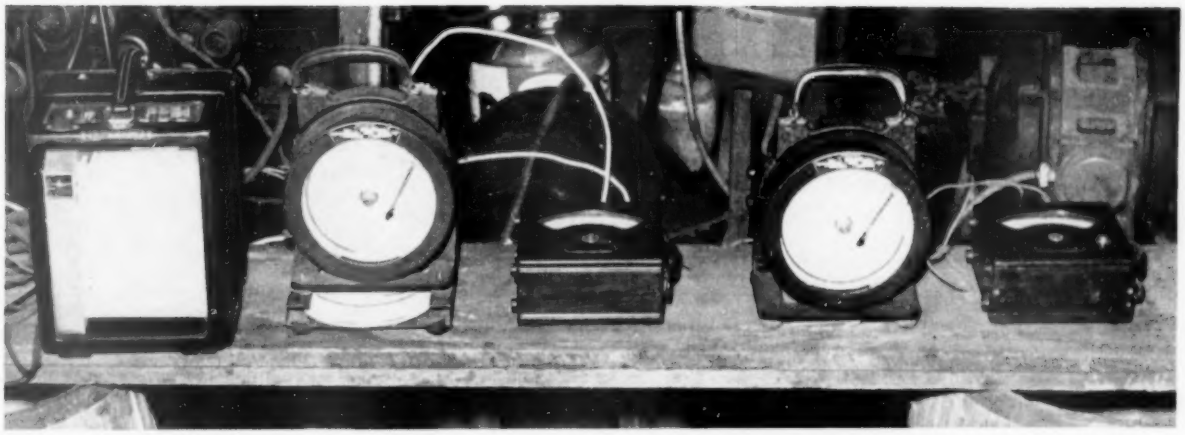
OIL CITY, Pa.—Field experiments of a new technique—giving an electrical "hot foot" to an oil well by a new method technically labeled "electrofracturing"—were recently completed here by Wolf's Head Oil Refining Co.

The experiments, conducting high voltage electrical current through the first Venango sand, were done at the Ranney process oil mine located between Franklin and Oil City, Pa. This Ranney-type oil mine consists of a large vertical concrete shaft sunk some 475 ft. to permit radial or "wagon-wheel" drilling of horizontal drain holes through the oil sand. It was installed as an experiment about a dozen years ago.

Pennsylvania Electric Co. collaborated with its special equipment and engineering staff throughout the entire tests. The object of the electrical applications was two-fold: (1) to electrofracture the oil formation, and (2) to induce movement of fluids. The second of these objectives was fulfilled as oil seepage was noted in one of the test wells which previously had shown no signs of oil. The fulfillment of the first objective was not successful. However, rock spalling was observed in the "hot well" as a result of intense heat generated at the electrode contacts.

Original tests . . . Prior research work on the electrofracturing technique was commenced some 3 years ago by Prof. C. Malcoln Davis, of Penn State, now Oil and Gas Journal district editor, Houston. Professor Davis' researches led to publication of his paper "Preliminary Investigations Toward Use of Electrical Energy for Producing Petroleum" at the sixteenth Technical Conference on Petroleum Production, held at Pennsylvania State College, October 22-24, 1952 *(See The Oil and Gas Journal, November 3, 1952, page 64.)*

While Professor Davis resigned from the Penn State faculty early this year



3 **ELECTRICAL INSTRUMENTS for measuring the electrical characteristics of the electrofracturing load. From left they are: (1) recording wattmeter; (2) recording ammeter; (3) indicating ammeter; (4) recording voltmeter; and (5) indicating voltmeter.**

to assume his Journal work, he returned to Oil City to supervise the Wolf's Head-Pennsylvania Electric electrofracturing field experimental tests.

Preparations . . . The electrical equipment had to be brought into the hilly Venango County oil field on a special trailer. The electrical circuit was set up with special provision for short circuit protection and for guarding the substation located about a mile away. Two tons of 6-in. conductor cable of high-voltage type and containing three 00 copper wires was brought on the site for the test.

Four test wells were prepared by Wolf's Head Oil to permit electrode spacings of 18 ft. and 36 ft. The installation of electrodes and attachment of electrode leads were supervised by a research engineer.

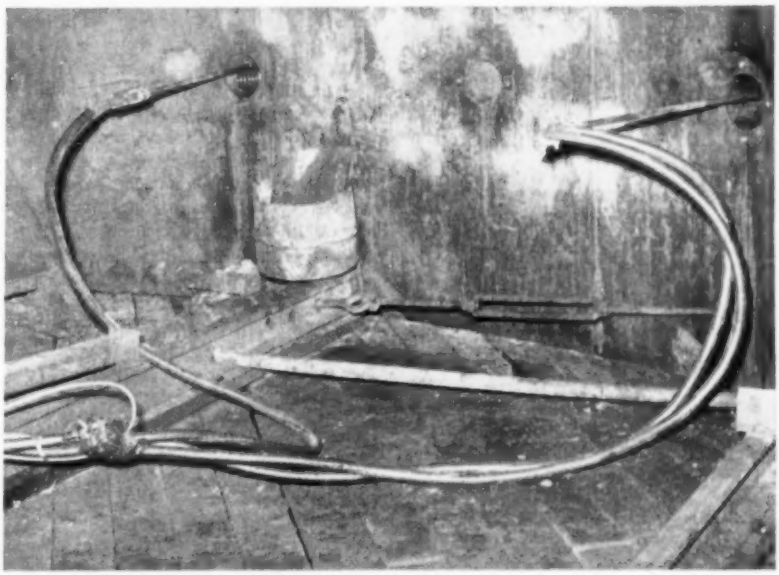
Tests took place over a 4-day period. Actual data are not available at this time as a series of confirmation tests are necessary first.

Voltage and power ranges were employed to determine the resistivity characteristics of the oil rock and to observe the behavior of the oil rock and fluids under an applied voltage. Occasionally clouds of steam and oil vapor were observed coming out of the hot well.

At times it was difficult to maintain electrode contact with the oil rock. Down time permitted making a firmer bond between the electrodes and the oil rock.

Electrical data was obtained for electrode spacings of 18 ft. and 36 ft.

C. B. McClintock of the Wolf's Head Oil Refining Co.; P. J. Stevenson, Pennsylvania Electric Co., and C. Malcolm Davis supervised the preparation for the field test. Observers were P. W. Emler, of American Gas & Electric Corp., and E. C. Cassidy, of Kentucky and West Virginia Power Co.



4 **HIGH-VOLTAGE OIL-SAND PROBES are these electrodes. The leads, with 7.5-KVA insulators used as spacers 4 ft. apart, were pushed back to the electrode heads, which were hammered snugly into place in the oil sand. The electric cable then was connected to the electrode leads before proceeding with the field test.**

5 **HAPPY-LOOKING PARTICIPANTS in the field tests included, from the left: R. Hill, manager of commercial sales, Pennsylvania Electric Co., Oil City; C. M. Davis, district editor of The Oil and Gas Journal, Houston; P. J. Stevenson, manager of industrial sales, northern division, Pennsylvania Electric Co.; and C. B. McClintock, development engineer, Wolf's Head Oil Refining Co., Inc., Oil City.**

Tidelands Bill Signed

President's signature to legislation returning offshore oil lands to states ends 20-year dispute over ownership

Bertram F. Linz

WASHINGTON.—Title to the offshore lands within their historic boundaries was officially returned to the states May 22 when President Eisenhower signed quitclaim legislation previously vetoed twice by former President Truman.

"I deplore and I will always resist federal encroachment upon rights and affairs of the states," Eisenhower said as he signed the measure before more than 40 senators and congressmen who fought for the legislation. "Recognizing the states' claim to these lands is in keeping with basic principles of honesty and fair play."

The President's signature formally ended a controversy which had its inception in the mid-thirties when the late Interior Secretary Harold L. Ickes first rejected applications filed for leases in the California offshore oil fields on the ground they were state property over which the federal Government had no control. Ickes later changed his mind.

Dispute grows . . . Subsequently, legislation instructing the attorney general to exert the federal Government's authority over the offshore lands was passed by the House but failed to get by the Senate. From time to time, thereafter, the matter was revived with ever increasing intensity, and members of Congress finally moved to enact legislation affirming the states' title. Former Atty. Gen. Francis Biddle filed suit in 1945 against one of the oil companies operating off the California coast claiming on behalf of the federal Government the submerged lands from which the company was obtaining oil under a lease executed by the state.

This suit was later dropped and a new case brought directly before the Supreme Court, which in 1947 held the federal Government had paramount rights in the oil and other resources of the Continental Shelf below the low-water mark. Similar decisions were later rendered in the case of Texas and Louisiana.

In the meantime, Congress twice passed legislation to restore title to the states, which was vetoed by President Truman.

Under the terms of the measure signed by Eisenhower the states receive title to submerged lands out to a distance of 3 miles except in the Gulf of Mexico where the historic boundaries of Texas and Florida are recognized as 10½ miles out.

Beyond these state lines, the law holds the submerged resources to be the sole property of the federal Government. Legislation now is being considered by the Senate Interior Affairs Committee establishing the procedures under which the Secretary of the Interior will issue leases for exploration and development in the Continental Shelf. The major issue in this legislation is the extent, if any, to which the states shall participate in the regulation of oil and gas operations and share in the revenues from the shelf.

The tidelands legislation represents the first major campaign promise on which Eisenhower has been able to make good, and Democratic leaders have made plain their intention to make a campaign issue of it in the 1954 congressional campaigns, attacking the Republican regime as the "give-away" administration.

Radio, Radar Now "Vital"

WASHINGTON.—Use of radio and radar by the petroleum industry has become so complicated that the industry now is dependent upon those facilities to a critical degree in all of its operations.

As a result the industry, and in turn the national security and defense, would be disastrously affected by any impairment or interruption of its communications facilities, the National Petroleum Council was told last week by a committee headed by F. W. Littell, of Shell Pipe Line Corp.

The radio and radar report was one of several submitted at the quarterly meeting of the council here May 28.

Because of the vital importance of communications, the committee recommended that the council continue to give careful study and consideration to the industry's radio and radar uses and make further reports as significant developments occur which might affect the petroleum industry.

The committee recommended that all radio matters of industry-wide concern be left in the hands of the American Petroleum Institute's central committee, whose record of accomplishments in this field, it said, "cannot be surpassed."

Wilmington Gas-Injection Officially Launched

These Long Beach, Calif., officials took part in the formal opening of a pilot gas-injection project in the harbor area of Wilmington field (The Oil and Gas Journal, May 25, page 283). Examining facilities in the $385,000 compressor plant built as part of the project are: (front row, left to right): Lyman B. Sutter, mayor of Long Beach; Francis Reider, harbor commissioner; L. L. Bendinger, gas-department superintendent; Bazil U. Carleson, city councilman; Samuel G. Miller, harbor-department gas engineer; M. W. Daubney, harbor commissioner; Ray C. Kealer, city councilman; (back row) E. J. Amar, port manager, and George R. August, harbor department reservoir engineer. The three compressor units are three-stage, 550-hp. Clarks. Modern features are vapor-phase cooling and adjustable cylinder clearances for flexibility.

WATCHING WASHINGTON

Bertram F. Linz

The Issue's Not Dead—Yet

Administrative officials are somewhat concerned over charges they are going to give away everything the Government owns, starting with tidelands oil.

That's an appealing issue, and congressional opponents of state rights and some newspapers throughout the country made the most of it while the tidelands bill was being considered. The only hopeful angle is that reports from the grassroots do not indicate the public is taking it seriously—yet. But there's an election coming up next year and the issue is far from dead.

Officials point out the Government hasn't given anything away so far, but has merely returned resources which it shouldn't have taken in the first place. In the case of the tidelands many doubt that, despite the Supreme Court decisions, the Government had any moral right to them. In the case of the Hell's Canyon power-flood-reclamation project there was little chance of getting the money to carry it out and also some question about the validity of estimates of what it would do.

These officials point out also that, far from giving anything away, the Government has cinched its claim to the oil and other resources of the Continental Shelf beyond the state boundaries.

Filibusterers Want Test

Senators who conducted a 4-week filibuster against the tidelands bill are now needling the administration to make a court test of the legality of its own legislation.

Specifically, 21 Democrats and the Senate's lone Independent asked Atty. Gen. Herbert M. Brownell, Jr., whether he intends to defend the interests of the United States against alleged claims by Texas, Louisiana, and Florida that their state boundaries extend beyond the 3-mile limit, citing legislation enacted in Texas to extend the state to the edge of the Continental Shelf.

The group cited State Department testimony that no state should be given a boundary beyond the 3-mile belt claimed by the United States.

In a letter to Brownell they asked what steps he planned to collect or retain for the federal Government the revenues from oil leases granted by the states beyond the 3-mile limit or whatever boundary the Justice Department believed they were entitled to under the tidelands bill.

They also asked whether he would bring a test case to determine if the measure is constitutional and valid and, if so, to obtain an interpretation of what the seaward boundaries are under the new law.

The senators also sent a copy of the letter to Secretary of State John Foster Dulles, asking him to see that the President is made aware "of the difficulties and dangers to the United States inherent in the attempt by Congress to give a few states boundaries in excess of the historical boundary claimed by the United States."

Rubber to Spare

World rubber production this year may be as much as 165,000 tons in excess of consumption, and the prospect of a heavy continuing surplus was a subject of concern to a rubber study group which met in Copenhagen this month.

The indicated production of synthetic rubber this year is 940,000 tons, of which 860,000 tons will be produced in this country. Synthetic consumption is placed at 885,000 tons, of which 800,000 tons will be used here.

The heavy surplus, about 100,000 tons, will accordingly be in natural rubber and the distributors in this country may urge the Government to cut back synthetic production by discontinuing the use of alcohol-base butadiene.

It is pointed out that the alcohol-based rubber is a high-cost product which would not be produced except as a government operation and its elimination would provide a market for the entire natural-rubber surplus.

The natural-rubber interests are not calling for abandonment of synthetic-rubber production. They admit they could not fill the gap in supply that would be entailed and, looking forward, they see a demand by 1960 for much more rubber, both natural and synthetic. But there is need, they say, for a relationship between the two that will not starve the natural-rubber producers out now and leave both free to expand as world requirements increase.

MID-CONTINENT

Deepest Flood

Oklahoma group to inject water in 11,000-ft. sands

BARTLESVILLE, Okla.—The deepest water-flood project in the United States, more than 2 miles in depth, was formally organized here last week by representatives of 12 producing interests in the North Lindsay pool of McClain County.

The meeting followed approval by the Oklahoma Corporation Commission of plans for unitizing a 720-acre block for water flooding. This initial operators-committee meeting was held at the offices of Cities Service Oil Co., principal operator in the deep area.

North Lindsay Bromide production was discovered in August 1945 by Cities Service in a series of fault blocks lying northwest of the Arbuckle Mountains. Production is from the Bromide sands of the Simpson (Ordovician) series lying at an average depth of 11,000 ft. The pool had produced 2,800,000 bbl. of oil to April 1, 1953.

James R. Hatfield, chief petroleum engineer of the oil-production division of Cities Service, presented a plan to operators here to recover an additional 1,500,000 bbl. of oil. Injection of water in structurally low wells in the field is expected to restore reservoir pressure and to prolong the life of the pool an additional 8 years. Currently most wells in the pool are flowing and may have to be placed on the pump soon. However, operators believe that, increased pressure later will permit operation of a flowing-type flood.

Cities Service is joined with these working-interest owners in the water-flood plan: Anderson - Prichard Oil Corp., N. Appleman Co., Aurora Gasoline Co., Eason Oil Co., W. F. Haynes, A. J. Lewis, Phillips Petroleum Co., Lindsay Corp., Mid-Continent Petroleum Corp., Sunray Oil Corp., and Zenith Petroleum Co.

Carter Expanding Lab

TULSA.—Carter Oil Co. has broken ground for a new addition to its research laboratory here, the third expansion in 6 years. The new wing, with 24,000 sq. ft. of floor space, will house the chemistry laboratory.

In addition, a new heavy-duty laboratory building and a warehouse will be erected on the same grounds. Dr. P. S. Williams, Carter's chief of research, said the expansion was necessitated by increased efforts to discover improved methods of finding oil and more efficient means of producing it.

Phillips Rule Upset

Appeals Court holds FPC authority goes back to first sale of gas by producer; Supreme Court appeal slated

Bertram F. Linz

WASHINGTON.—A Supreme Court reversal or action by Congress appear to be the only ways the natural-gas industry can escape the situation created by a Circuit Court of Appeals decision that Federal Power Commission authority extends to the first sale of natural gas by a producer and gatherer.

By a 2-to-1 decision the court upset a finding by the FPC that the Phillips Petroleum Co. is not a natural-gas company within the meaning of the Natural Gas Act and so is exempt from FPC's rate-making authority.

While directly aimed at the vast natural-gas activities of the Phillips company, the court's ruling affects more than 2,000 other gas producers and distributors who would automatically come under FPC jurisdiction if the decision stands.

Appeal certain . . . Phillips officials asserted immediately that the case will be appealed to the Supreme Court. Since that body is now winding up its 1952-53 term, the issue will not be heard until next fall or winter.

The case was brought before the Circuit Court by the State of Wisconsin and four cities which contested the FPC finding that it has no authority over the production and gathering of gas in wholly intrastate operations. The court ruled that the commission has jurisdiction under the law over sales "for resale and transportation in interstate commerce."

There are indications that Congress, which has tried unsuccessfully in the past to write "hands off" legislation exempting independent producers and gatherers of natural gas from FPC authority, will not wait for the case to reach the Supreme Court.

Congress may act . . . Rep. John E. Lyle, Jr., of Texas, has announced he will press for passage of his bill to affirm the policy enunciated by the FPC in the Phillips case. This bill is similar to a measure introduced by Sen. Robert S. Kerr of Oklahoma, passed by Congress in 1950, and subsequently vetoed by former President Truman.

A showdown on the issue of the commission's authority over production and gathering has been building up over a period of years. The issue was the subject of controversy within the commission itself, and, in 1947 following a congressional investigation, it adopted its famous Order 139 stating it would not assert jurisdiction over independent producers and gatherers who might be subject to jurisdiction solely because of arm's-length sales of gas.

In July 1950 the commission rescinded that order as a result of Truman's veto of the Kerr bill but said it was not its intention to investigate the rates charged by producers and gatherers except where their sales may have a material effect on interstate commerce. The Phillips case, then pending, was the first in which the commission exercised this new policy.

Regulation gap . . . The whole issue lies in an area in which there has been a gap between state and federal regulation. As far back as 1924 the Supreme Court ruled the states could not regulate rates at which natural gas was sold at points remote from the wells. It held that these were transactions in interstate commerce which Congress had the power to regulate.

Subsequent court rulings, however, it was pointed out by Judge Henry W. Edgerton in rendering the Circuit Court's decision, have upheld the commission's authority to regulate the rates "at which a producer and gatherer of natural gas sells it, after producing and gathering it, to pipe-line companies for resale in other states."

The Natural Gas Act specifically exempts "production and gathering" from FPC regulation. The failure to define exactly what is covered by those words led to confusion which 15 years of Natural Gas Act enforcement has failed to resolve.

In its decision in the Phillips case, the commission ruled that the company's movement of gas in interstate commerce and its sales for resale in interstate commerce, together with its processing operations, all constitute a part of its gathering business or are incidents or activities related to it, so that the movement, processing, and sales come within the exemption provided in the law.

Four Men Cited for Meritorious Service

These men were honored at the recent Casper A.P.I. meeting for meritorious service to the Rocky Mountain district of the American Petroleum Institute's Division of Production. The awards were made by John J. Pew, vice president of Sun Oil Co. and vice president of the A.P.I.'s Division of Production. Left to right are C. L. Larson, Jr., Stanolind Oil & Gas Co., Casper; W. M. Saxon, Pure Oil Co., Billings; H. H. Healy, Ohio Oil Co., Casper; and Claude Peavy, Phillips Petroleum Co., Denver.

Phillips Sells Telephone Setup

BARTLESVILLE. — Phillips Petroleum Co. has sold its private wire-communications system to American Telephone & Telegraph Co., General Telephone Co. of the Southwest, and Southwestern Bell Telephone Co.

Involved in the transaction were 10,000 miles of communications circuits and 1,300 miles of pole lines owned by Phillips. Phillips has operated its own telephone system 34 years. The change is effective as of May 1 and was approved earlier by the Federal Communications Commission.

Edwin M. Clark, president of Southwestern Bell, said additional installations are planned "to match the continued expansion planned by Phillips." When completed, the additions now planned will provide a system serving 56 pumping stations and offices in 22 cities with 75-circuit installations and 26 points with private-line teletypewriter service. In all, 9,100 miles of private-line telephone circuits and 4,500 miles of teletypewriter circuits will be provided, he said.

In addition to its privately owned system, Phillips has leased facilities from the Bell system for many years. Its main switchboard here, with more than 2,000 stations, is the largest PBX system furnished by Southwestern Bell in its five-state territory.

Petrochem Output Down

Tariff Commission report shows oil's aromatics program growing despite decline in total 1952 basics production

WASHINGTON. — Last year's production of basic petrochemicals showed a slight decline from the previous year.

Preliminary figures released last week by the U. S. Tariff Commission showed 1952 production of crude products from petroleum and natural gas for chemical conversion at 7,836,139,000 lb., about 6.6 per cent less than the 1951 total.

Aliphatics declined about 11 per cent, reflecting the corresponding slump in intermediates consumed for textiles and other finished products. Total aromatics showed a slight gain over 1951, due to increased benzene and toluene recovery from petroleum. Most other aromatics showed decreased production.

For the first time, the commission shows separate production figures for ethane and ethylene, the latter showing an output of 1,778,730,000 lb. last year. Of the C_3-and-lighter basic hydrocarbons, the ethane-ethylene group showed the only increase over 1951. This is considered due largely to rising synthesis of polyethylene which offset declining demand for some other C_2 intermediates.

Some statisticians believe that the higher C_2 figure shown for 1952 may also be in part an adjustment, since the commission's 1951 production of this class of basic hydrocarbons was generally considered low. The slower market for many alcohols and ketones last year are reflected in the declines in total C_3 and C_4 crudes.

New groups . . . Another group reported for the first time is the C_5 hydrocarbons which totalled over 15 million lb. last year. No basis for comparison with previous production is available, since this class was lumped with miscellaneous hydrocarbons in former reports. In the heavier aliphatics, dodecene and diisobutylene both showed substantial increases over 1951.

The growing aromatics program in the petroleum industry is revealed in the 1952 figures for benzene and toluene. Benzene production was up 9 per cent over 1951, and toluene scored a 15 per cent gain. The declining interest among many refiners in the separation of cresylic and naphthenic acids was reflected in rather sharp drops in production of both of these basic chemicals.

The accompanying table summarizes the 1952 figures, and compares them wherever possible, with corresponding figures reported by the commission for the two previous years.

Annual Production of Basic Petrochemicals, 1950-52

(In thousands of pounds)

PRODUCT—	1952*	1951	1950
Aromatics and naphthenes—			
Alkyl aromatics, distillates and solvents	391,263	432,139	
Benzene (except motor grade)	255,730	234,521	72,927
Cresylic acid, crude	14,317	20,386	16,080
Naphthenic acids, total	19,319	38,528	24,684
Toluene, all grades	463,650	403,327	329,112
Xylenes, mixed	443,804	464,416	449,587
All other	17,038	5,190	532,571
Total aromatics and naphthenes	1,605,121	1,598,507	1,424,961
Aliphatic hydrocarbons—			
C_2 hydrocarbons, total	1,981,909	1,798,915	1,821,893
Ethane	203,179		
Ethylene	1,778,730		
C_3 hydrocarbons, total	1,576,421	2,122,015	1,692,889
Propane	580,139	973,561	998,842
Propylene and propane-propylene mixture	996,282	1,148,454	694,047
C_4 hydrocarbons, total	2,373,650	2,819,441	1,638,649
N-butane	37,856		
1,3-butadiene, grade for rubber	1,106,445	1,222,411	610,056
1-butene and 2-butene mixture	825,171	1,136,188	641,072
All other	404,178	460,842	387,521
C_5 hydrocarbons	15,401	see below	see below
All other aliphatic hydrocarbons and derivatives, total	283,637	267,984	356,669
Diisobutylene	25,325	21,670	20,044
Dodecene	114,983	93,510	
Hydrocarbons derivatives	1,920	22,758	
All other	141,409	130,046	336,625
Total aliphatic hydrocarbons	6,231,018	7,008,355	5,510,100
Grand total	**7,836,139**	**8,606,862**	**6,935,061**

*Preliminary. Source: U. S. Tariff Commission.

Product Stocks Drop

Secondary storage of major products still above 1952

SECONDARY stocks of the four major products decreased 2,601,000 bbl. during the month of March and totaled 45,167,000 bbl. at the end of the month, according to figures released by the Census Bureau of the Department of Commerce. In the corresponding month last year, secondary inventories were cut 2,988,000 bbl.

Stocks at the end of March were 1,500,000 bbl. greater than at the end of March 1952. Most of the increase over last year was due to the gain of 780,000 bbl. in secondary distillate stocks. However, distillate stocks at the end of March represented a gain of only about 6 per cent over inventories reported for March 1952. This is not out of line with increases in distillate demand. Primary distillate stocks at the end of March were about 23 per cent greater than a year earlier.

Enough monthly data on secondary stocks are now available to indicate that

the most important seasonal change in secondary inventories is in distillate fuels. Between September 30, 1951, and March 31, 1952, distillate stocks were reduced 7,875,000 bbl. In the same period last winter, the drop amounted to 8,912,000 bbl. or a reduction of 39.3 per cent. Primary distillate stocks dropped 50.5 per cent between October 31, 1952, and March 28, 1953.

Total secondary stocks of major products decreased 13,126,000 bbl. between September 30, 1952, and March 31, 1953, including reductions of 2,186,000 bbl. for kerosine and 2,280,000 bbl. for residual in addition to the larger drop for distillate. Secondary gasoline stocks increased only 252,000 bbl. in the above winter period.

SECONDARY STOCKS
(Thousands of barrels)

	Mar. 31, 1953	Feb. 28, 1953	Mar. 31, 1952
Gasoline:			
Dist. 1	5,396	5,622	5,216
Dist. 2	8,854	8,495	8,718
Dist. 3	3,035	3,185	3,299
Dist. 4	983	918	928
Dist. 5	2,074	1,885	2,054
Total	20,342	20,105	20,215
Kerosine:			
Dist. 1	2,280	2,394	2,295
Dist. 2	2,852	3,070	2,895
Dist. 3	776	771	660
Dist. 4	93	93	107
Dist. 5	106	98	109
Total	6,107	6,426	6,066
Distillate:			
Dist. 1	6,026	7,775	5,300
Dist. 2	4,892	5,735	4,966
Dist. 3	1,223	1,029	1,049
Dist. 4	463	476	425
Dist. 5	1,155	1,095	1,239
Total	13,759	16,110	12,979
Residual:			
Dist. 1	3,459	3,246	2,719
Dist. 2	1,176	1,326	947
Dist. 3	262	399	623
Dist. 4	6	5	7
Dist. 5	56	151	102
Total	4,959	5,127	4,398
Major products:			
Dist. 1	17,161	19,037	15,530
Dist. 2	17,774	18,626	17,526
Dist. 3	5,296	5,384	5,631
Dist. 4	1,545	1,492	1,467
Dist. 5	3,391	3,229	3,504
Total	45,167	47,768	43,658

TRENDS IN SECONDARY STOCKS
(Millions of barrels)

1951—	Gaso.	Kero.	Dist.	Resid.
Aug. 31	20.5	8.1	18.6	7.0
Sept. 30	19.7	8.6	20.9	7.0
Oct. 31	18.6	8.8	21.6	7.6
Nov. 30	19.6	8.1	19.6	6.3
Dec. 31	18.6	7.6	18.2	5.5
1952—				
Jan. 21	20.6	7.1	17.3	5.4
Feb. 29	20.7	6.5	14.9	4.6
Mar. 31	20.2	6.1	13.0	4.4
July 31	21.1	7.7	17.5	7.2
Aug. 31	20.2	8.0	20.6	7.0
Sept. 30	20.1	8.3	22.7	7.2
Oct. 31	20.4	8.3	22.2	6.7
Nov. 30	19.9	8.0	21.5	6.5
Dec. 31	19.5	7.3	19.1	6.3
1953—				
Jan. 31	20.8	7.2	19.2	6.3
Feb. 28	20.1	6.4	16.1	5.1
Mar. 31	20.3	6.1	13.8	5.0

Carbon-Black Report

Drop in export market cut output in '52, bureau says

TOTAL production of carbon black decreased 4.37 per cent in 1952 because of the decrease in the export market, according to the annual survey by the Bureau of Mines.

Domestic sales increased 2.2 per cent to 1,154,274,000 lb. for the year. Export sales were off 32.4 per cent to 292,908,000 lb. for the smallest annual total since 1946.

Total production in 1952 amounted to 1,604,102,000 lb. compared with 1,677,363,000 lb. in 1951. Production of furnace blacks increased about 1 per cent to 1,040,505,000 lb. Contact black decreased 12.7 per cent to 563,597,000 lb.

During 1952, three new furnace plants were started up, and two channel plants were shut down for a net increase of one operating plant for the year.

Plants in Texas produced 66.9 per cent of all blacks during the year compared with 68.6 per cent of the total in 1951.

Total value at plants of all carbon black produced in 1952 was $101,988,000 for an average of 6.36 cents a pound compared with 6.41 cents in 1951.

Yields of carbon black from both gas and liquid hydrocarbons increased during the year. Total natural gas used amounted to 368,399 M.M.c.f. with a yield of 2.87 lb. per M.c.f. compared with 1951 yield of 2.67 lb. The volume of liquid hydrocarbons used totaled 163,392,000 gal. with a yield of 3.35 lb. per gallon. The 1951 yield was 2.96 lb.

The quantity of natural gas used in 1951 represented a decrease of 13.6 per cent from 1951. The increase in average value of gas used from 5.21 cents per M.c.f. in 1951 to 5.46 cents in 1952 was a probable factor in the large decrease in volume of gas used.

Byrd Oil Corp. Expands

DALLAS. — McConnell Drilling Corp. and Anco Gas Corp. have been acquired by Byrd Oil Corp. through an exchange of stock.

Anco Gas Corp. holds interests in 27 producing oil and gas wells in Texas, a small refinery and a recycling plant in Anderson County, Texas. In addi-

New Logging Series to Start Next Week

A SERIES of short articles on the theory and practice of electric logging will begin in next week's issue of The Oil and Gas Journal under "Engineering Fundamentals." This series, which will consist of more than 50 installments, presents the state of knowledge of electric logging in such a form that it may be of direct benefit to administrative and technical personnel who have to deal with electric logs.

REX MARTIN

Professor Rex I. Martin, author of this series, has steered midway between those descriptions which are too elementary to be of help in dealing with field problems and the extremely technical that presuppose the reader is well informed. He has given sufficient detail for most purposes and provides a foundation on which additional information may be built by those interested in special phases of log interpretation.

Martin, a member of the petroleum-engineering faculty at Missouri School Mines and Metallurgy at Rolla, Mo., graduated from the Royal School of Mines in London with a B.S. degree in oil technology. He worked as a subsurface geologist and petroleum engineer for Trinidad Leaseholds, Ltd., in Trinidad, B.W.I., and in Venezuela with an associated company for 13 years. Martin became a faculty member at Rolla in 1950 and is completing some research on formation factors and resistivity indices. He is coeditor of a symposium on water flooding published as a bulletin of the School of Mines.

tion Anco has some undeveloped acreage.

McConnell Drilling operates principally in the Rocky Mountains.

Plans call for the sale of the refinery and recycling plant.

Reserve Status Reported

WASHINGTON. — The petroleum-refining industry could lose as many as one-fourth of its chemical engineers and one-sixth of its chemists by a general call-up of reservists in the event of war. It was estimated this week by the National Science Foundation and the Department of Labor.

The estimate was based on a sample survey of the reserve status of approximately 48,000 chemists, representing slightly more than half the total number in the United States, and 13,000 chemical engineers, roughly one-third of the total in that profession. The survey showed that approximately 3,300 chemists and 2,000 chemical engineers were employed in the refining industry.

Industry Briefs

ELK CITY, Okla.—A. J. Galloway, vice president of Shell Oil Co., will be principal speaker here June 2 at the Elk City Oil Exposition, an educational show aimed at explaining the oil industry to the layman. Galloway directed the development of Elk City field.

WILLISTON, N. D. — Service Pipe Line Co. has let contract to O. R. Burden Construction Co., Tulsa, for construction of its 160-mile crude-oil line connecting Tioga and Beaver Lodge fields with the now-building Standard Oil Co. (Ind.) refinery at Mandan. Construction is scheduled to begin by mid-June. The project will provide the first pipe-line outlet for North Dakota's growing crude production. Truck transport is now used to move the crude to refineries.

WICHITA, Kans. — Kansas allowables for June have been set at 310,000 bbl. daily, unchanged from May. Purchaser nominations totaled 329,915 bbl. daily.

MIDLAND.—Humble Oil & Refining Co. has notified its royalty owners in Spraberry Trend Area field that it will continue royalty payments even though its 116 wells are shut in by Texas Railroad Commission order. Humble gave no explanation for the action. In a letter to royalty owners, the company also said that payments made while the wells are off production will not be deducted from later royalty checks.

AUSTIN. — Anchor Petroleum Co. has been given a go-ahead by the Texas Railroad Commission on plans for underground storage of L.P.G. and disposal of salt water in a salt-section cavity in Martin County. The project will be in Section 23, Block 37, of the T. & P. R. R. Survey. The salt section is found between 1,600 and 2,200 ft.

BATON ROUGE. — The Louisiana Conservation Department has fixed the June oil-production allowable for the state at 697,864 bbl. daily—an increase of 2,765 bbl. daily over May. The allowable was raised to take care of new production, the department said.

VILLE LASALLE, Que.—Monsanto Canada, Ltd., an affiliate of Monsanto Chemical Co., will build a $400,000 petroleum additive plant here. Several types of detergents and inhibitor additives for blending with lube oils and certain special compounds for gear lubricants will be synthesized.

OKLAHOMA CITY.—The Oklahoma oil-production allowable for June has been set at 519,260 bbl. daily by the Oklahoma Corporation Commission, unchanged from May. The commission retained the same allowable over the protests of several major companies and purchasers who cited figures showing a decline in crude stocks in Oklahoma and Kansas of about 4,000,000 bbl. in the last year.

WASHINGTON. — Northwest Natural Gas Co. has announced that it has withdrawn its application for a permit to export gas from Pincher Creek field in Alberta to serve the Pacific Northwest. Arthur Logan, attorney for Northwest, said at the resumption of a consolidated hearing before the Federal Power Commission that the company, however, will continue to seek permission from Alberta authorities to pipe gas to eastern Canada.

CANADA

Petrochem Plant Opened

MONTREAL, Que.—A. B. Shawinigan, Ltd., last week formally inaugurated production of phenol and acetone from petroleum at the new plant located at Montreal East.

Jointly owned by British American Oil Co., Ltd., and Shawinigan Chemicals, the operation is supplied with raw material in the form of cumene, synthesized by British American at its adjacent refinery.

In addition to the annual production capacity of 13,000,000 lb. of phenol and 8,000,000 lb. of acetone, the new petrochemical plant also will produce as byproducts, acetophenone, mesityl oxide, and alphamethylstyrene.

The new plant is the first commercial application of a process licensed by Hercules Powder Co. of Wilmington, Del., and Distillers, Ltd., of London, England. The plant was built by Canadian Kellogg Co., Ltd.

Refinery Work Started

KAMLOOPS, B. C.—Royalite Oil Co., Ltd., will start preliminary work immediately on construction of a 5,000-bbl. refinery here to process Alberta crude obtained from a connection with Trans Mountain Oil Pipe Line Co.

Construction is scheduled to proceed in two phases. Crude-distillation facilities will be completed first to produce gasoline, burner oils, tractor distillate, diesel and bunker C fuels.

A cat cracker is scheduled for completion in about 18 months, and other processing units may be added as demand warrants.

Shell Organizes New Firm

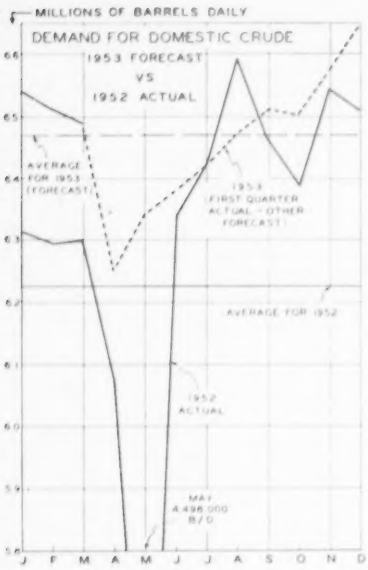
TORONTO. — The Royal Dutch-Shell Group has organized a new wholly owned subsidiary in Canada, under the name of Canadian Shell, Ltd.

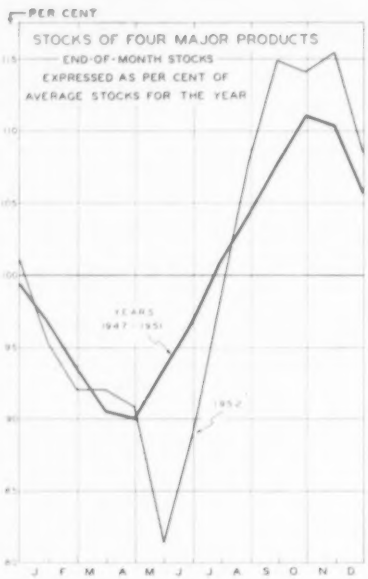
The subsidiary, incorporated under Ontario charter, is capitalized at $200,000,000 and will hold certain of the Royal Dutch-Shell investments in the Western Hemisphere.

Ponder Buys Devon Drilling

CALGARY.—Ponder Oils, Ltd., has acquired all assets of Devon Drilling Co., Ltd., of Wetaskiwin and will operate the firm as a wholly owned subsidiary.

Devon Drilling, formed in 1948, has interests in producing wells in Leduc and Bonnie Glen fields and also in Texas and Montana. It also owns three 8,000-ft. rigs. It will continue to operate as a contract driller in Alberta, according to announcement by W. L. Falconer, managing director of Ponder.


MILLIONS OF BARRELS DAILY
DEMAND FOR DOMESTIC CRUDE
1953 FORECAST
VS
1952 ACTUAL
AVERAGE FOR 1953 (FORECAST)
1953 (FIRST QUARTER ACTUAL - OTHER FORECAST)
AVERAGE FOR 1952
1952 ACTUAL
MAY 4,496,000 B/D
J F M A M J J A S O N D


PER CENT
STOCKS OF FOUR MAJOR PRODUCTS
END-OF-MONTH STOCKS
EXPRESSED AS PER CENT OF
AVERAGE STOCKS FOR THE YEAR
YEARS 1947-1951
1952
J F M A M J J A S O N D

Crude-Demand Outlook

Third-quarter requirements will be under 1952, but such a comparison would be misleading; strike made '52 abnormal

John C. Casper

DEMAND for domestic crude in the third quarter of this year will be less than in the same quarter of 1952 because of the large increase in refinery runs following the strike last year.

Gasoline stocks at the end of the strike were down to about the level that would have been normal for the end of the summer. Since most of the remaining gasoline inventories were required for working stocks in refining, transportation, and marketing divisions, refiners had to process enough crude to meet the summer gasoline demand out of current production.

These very high operating levels at refineries during July, August, and September used up some of the crude that had been run to storage in April and May. If there is no period of widespread strikes this summer, suppliers will have gasoline inventories to meet part of the motor-fuel demand in the third quarter. The expected increases in demand will not be enough to overcome the big boost in crude use that was required last year, following the loss due to the strike.

What to expect . . . If refinery operations show an increase in the third quarter, product stocks will crowd all possible storage and create soft product markets. If refiners hold runs to normal demand levels, then crude production will either average less than last year or crude stocks will climb to burdensome levels.

The comparison of actual monthly demands for domestic crude in 1952 with actual use in the first quarter of 1953 and forecast of demands for the other months is shown in the chart at left. The forecast of demand for domestic crude in 1953 includes crude runs at domestic refineries, crude exports, crude used without refining, and crude losses. The forecast for 1953 is based on a gain of about 4 per cent over 1952, compared with an increase in 1952 of only 1.9 per cent. This larger increase in 1953 allows for some reduction in crude imports in the last half of the year.

Crude-demand forecast . . . Comparison of the use of crude in the first quarter of this year with the same period in 1952 may not give a true picture of the year as a whole since crude demands in the first quarters of both years were abnormally high.

For the 5-year period 1947-51, demand for domestic crude in the first quarter averaged only 97.4 per cent of the daily average for the year. In contrast, crude use in the first quarter of 1952, on a daily average basis, was 101.2 per cent of the average for the year.

Final figures for the volume of crude used in the first quarter of this year indicate that a larger portion of the year's total was used in the first quarter than the average for 1947-51.

Demand for domestic crude averaged 6,514,000 bbl. daily in the first 3 months of this year. If this were to represent, on a daily average basis, 97.4 per cent of the year's average, as was the case in the 1947-51 period, total demand for domestic crude in 1953 would be 6,688,000 bbl. daily or 7.4 per cent greater than in 1952.

Outlook for stocks . . . The abnormal stock changes caused by the strike are shown in chart at right. Since major-product stocks, particularly gasoline stocks, were depleted rapidly during the strike period in May 1952, even normal stocks in 1953 will exceed the totals reported for May, June, and July last year.

Stocks in chart (right) are expressed as percentages of average month-end stocks for the year. In the 1947-51 period, stocks of the four major products at the end of May were about 6.5 per cent less than at the first of the year after having dropped to 10 per cent below at the end of April. Stocks at the end of May 1952 were about 19 per cent below the first of the year. It was the rapid rebuilding of these inventories during the summer months, shown by the steep 1952 line on the chart, that called for high refinery runs and abnormal crude demands in the third quarter last year.

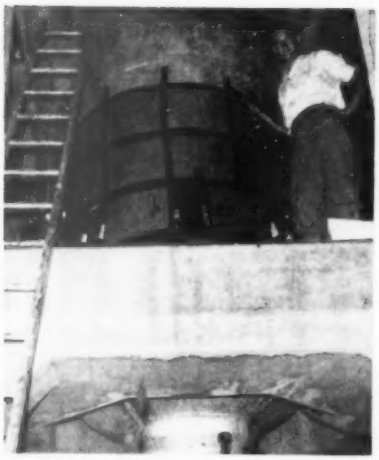
For the next few months, any comparison of current product stocks with 1952 must give consideration to the abnormal conditions last summer.

Net Incomes Are Down

Total net income for 50 reporting oil companies was 2.4 per cent less in the first quarter of 1953 than in the same quarter last year, according to a tabulation by Carl H. Pforzheimer & Co.

Total net income reported by all of the listed companies amounted to $594,240,000 for the first quarter this year compared with $608,289,000 last year.

A total of 28 companies reported increases in net income for a total gain over the first quarter of 1952 of $14,754,000. This increase was more than offset by the total decrease of $28,803,000 reported by the other 22 companies.



BLISTER RECORD was provided on film, taped around lower section of unit, which was exposed by radioactive waves from within.

ALUMINUM CAPSULES which contained iridium grains used in the project. Grains were exposed to radiation at atomic-energy stockpiles.

Inspection Aid

Reactor blisters pictured using radioactive iridium

F. Lawrence Resen

HOUSTON. — The "hottest" spot in the nation last week was Eastern State Petroleum Co.'s refinery here, where radioactive isotopes were used to photograph hydrogen blisters in the steel shells of two reactor units.

According to Paul Herzig, president of Isotope Products, Inc., Houston, the 76,000 millicuries of Iridium 192 used in the operation represents the largest single concentration of radioactive isotopes in the United States. Additionally, the undertaking represented the first time in the history of the petroleum industry that isotopes were used to photograph blisters, he said.

As a result of the tests, Eastern States engineers were able to determine, from dark spots on the exposed film, where the blisters are occurring and what corrective meaures are needed.

Initially, physical inspection had detected "hot spots" on the shell of the units, which were concentrated in the lower half of the vessels. The individual vessel is approximately 20 ft. high and 5½ ft. in diameter. The outer shell consists of 2⅜ in. of steel, with a 5-in. internal layer of concrete and a ⅛-in. chrome-steel lining. It was to penetrate this thickness—equivalent to 3⅜ in. of steel—that the big isotope concentration was required.

How isotopes were used . . . Iridium grains were sealed in aluminum capsules—approximately half an inch long and of about the same diameter as a lead pencil—and exposed to radiations at the Chalk River atomic plant operated by the Atomic Energy Commissiion of Canada. The five capsules required were transported to Houston in lead containers weighing from 100 to 150 lb.

In preparation for the actual operation, the reactor was opened both from the top and the bottom and a steel cable lowered from the upper access hole. A container was attached to the end of the cable, and the crew, using 6-ft. rods, took the iridium capsules out of the lead packages and inserted them into the container. The cable was then raised and the container positioned within the reactor as required, with 38,000 millicuries in each reactor

Previously, four rows of film had been taped to the lower section of each unit. The films were 14 by 17 in. A total of 112 individual films were required for the two reactors. The container was positioned in the exact center of the portion of the unit covered by the film. Since the two center rows of film were closest to the redioactive source, they were exposed only 5 hours, while the outer two rows required an 8-hour exposure period.

Esso Adjusts Crude Prices

SHREVEPORT.—Esso Standard Oil Co., Louisiana division, announced adjustments in prices paid for crudes from five East Louisiana fields and initial postings for four other fields, effective May 21.

Crude from Ross Bayou was raised 2 cents a barrel to a schedule with a top of $2.65 for 40° gravity and above. Crudes from Deer Park, Esperance Point, Fairview, and Lisemore Landing were raised 7 cents and now have a top of $2.70 for 40° gravity and above.

New postings were reported for Bayou Choctaw and Glenmora in Louisiana, Overton in Mississippi, and Fouke, West in Arkansas.

TWENTY-ONE STORY office building to be built in downtown Houston by Continental and Texas National Bank. The project will include also a 12-level, parking-garage building.

New Office Building

Continental, bank to build big structure in Houston

HOUSTON.—Continental Oil Co., in partnership with the Texas National Bank, will build a $10,500,000 office building with 21 floors in downtown Houston.

Continental's executive, southern region, and Houston marketing division offices will occupy the top seven floors. Under the agreement with the bank, Continental will own the top 10 floors, the bank will own the 10 lower floors, and each will have a 50 per cent interest in the remaining floor.

The project also will include an open-type garage building of 10 stories above ground and two below street level. The garage will hold more than 500 cars and will be connected by tunnel to the office building.

Construction is expected to begin this week.

SOUTHWEST

Tidelands Action Planned

AUSTIN.—Plans for creation of a "submerged-land division" of the Texas General Land Office to handle affairs of offshore development were announced last week by Land Commissioner Bascom Giles.

Signing of the tidelands bill by President Eisenhower *(See National Affairs)* means, Giles said, the return to the state of 2.5 million acres which "have

risen greatly in value in recent years, even without actual development."

The new division, Giles said, "will have full responsibility of meeting the physical and legal problems" arising within the 10½-mile limit.

Every effort will be made, he added, to get development in the area "in full swing" immediately, but he added that "no private or governmental agency can acquire that much land and potential wealth without incurring complications."

Allowables by Districts Set

AUSTIN.—Texas production allowables for June 1 by districts have been announced by the Texas Railroad Commission. The following is a comparison of these district allowables with production allowables for May 2. *(For other information on Texas allowable see The Oil and Gas Journal, May 25, page 145.)*

ALLOWABLE PRODUCTION IN TEXAS
(Thousands of barrels daily)

	June 1	May 2
Dist. 1	42,667	41,958
Dist. 2	161,409	156,149
Dist. 3	483,531	473,161
Dist. 4	269,845	262,233
Dist. 5	51,717	50,235
Dist. 6 (outside E. Tex.)	128,567	127,859
East Texas field	257,718	249,839
Dist. 7-B	145,854	141,578
Dist. 7-C	182,902	174,824
Dist. 8	963,475	935,718
Dist. 9	237,022	231,683
Dist. 10	94,727	94,443
Total	3,619,434	2,939,734

WEST COAST

FIRST OF THE FOUR injection wells drilled in a diamond around the pilot producer.

Pilot Flood

Shell launches project in Coalinga Eastside field

BAKERSFIELD, Calif. — Shell Oil Co. has started a pilot water-flood project in the shallow Temblor sands in Coalinga Eastside field with a view to flooding the entire field if the experimental operation is successful.

Site of the trial flood is in the crestal portion of the field near the old boom town of Oilfields. Injection is to be made through four input wells drilled around an old producer. The injection wells were continuously cored from about 600 ft. to their total depth of 1,200 to 1,600 ft.

More than 1,000 wells have been completed at Eastside Coalinga since its discovery in 1899 over an area of about 8,500 acres. More than 287,000,000 bbl. of oil has been recovered from the 1,200 to 2,500-ft. Temblor (Miocene) sands. Currently about 16,000 bbl. daily is being produced by the 800 remaining producers.

Brackish water unsuitable for domestic or agricultural use is to be obtained at a well about 3 miles from the injection site. A closed injection system is being used, with the water being filtered and inhibited against corrosion and algea growth before being injected. Storage, flow, and chemical treatment of the water is being automatically controlled by electronic equipment.

Exploration Ruling Expected

SANTA BARBARA, Calif. — The Department of Interior is expected to rule soon as to whether its January order barring oil and gas exploration on lands in the watershed area of California's Santa Ynez Valley should stand.

The Santa Ynez Valley lies parallel to the coast of California a few miles inland from Santa Barbara.

Oil men affected by the order contended at a recent public hearing on the order that withdrawal of these lands, totaling about 330,000 acres, is a "drastic step" and not necessary to guard against erosion, pollution, or fire hazards.

Arthur C. Fisher, Los Angeles, representing a group of lease applicants, testified that the oil interests are as much concerned with prevention of fires, erosion, and pollution as the U. S. Forest Service which asked that exploration be prohibited.

He pointed out that numerous fields are being operated along other southern California rivers without damage to watersheds. One example, he said, are the fields along the tributaries of Santa Paula Creek which have been producing for 75 years without harm to Santa Paula's water supply.

Paul Home, Standard Oil Co. of California, and Cecil H. Phillips, representing a block of lease applicants, also spoke at length in opposition to the closure.

Organizations representing Santa Barbara County residents protested any reopening of exploration operations.

Subsequent to the hearing, both sides were given time to submit supplemental information before the department makes its final ruling on the issue.

Deep Test Sets Mark

California depth record is broken by Paloma wildcat

LOS ANGELES.—California's drilling depth record was broken last week when an Eocene test in Paloma field, Kern County, cut ahead past the old mark of 18,734 ft.

This San Joaquin Valley well, Ohio Oil Co. 72-4 K.C.L.A., is scheduled to thoroughly test the Eocene and may set a world's depth record. Present record is 20,521 ft., established by a Superior Oil Co. wildcat in the northeastern portion of the Green River basin of Southwest Wyoming.

Ohio's deep test is one of several deeper-pool tests checking into the Eocene possibilities in the southern end of the San Joaquin Valley. Interest in the Eocene in this portion of the valley was stimulated when Richfield Oil Corp. completed an Eocene well at Wheeler Ridge field in April 1952. Richfield's well, near the southern tip of the valley, was the first to find the Eocene productive south of Belgian anticline, 40 miles to the northwest.

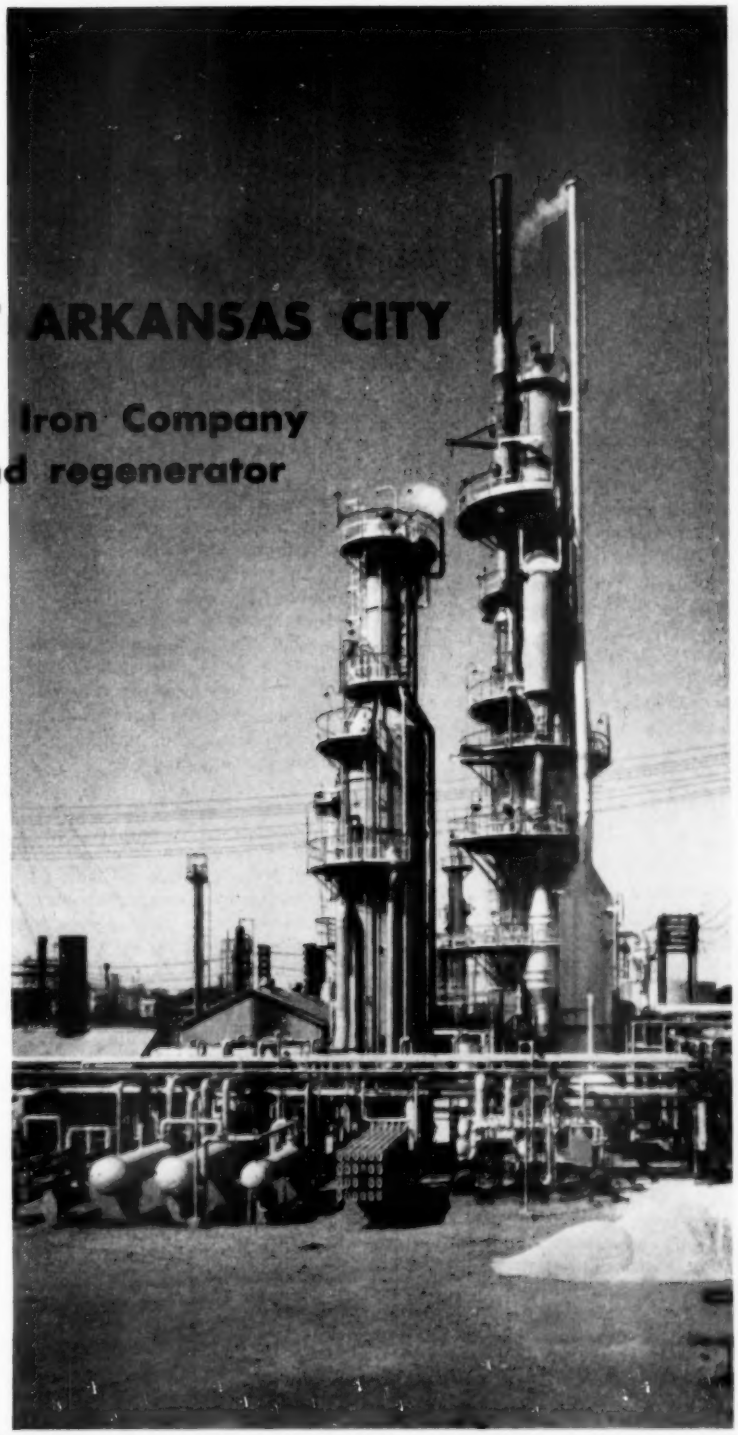
Other deep tests in the southern portion of the San Joaquin Valley are Richfield 67-29 C. L. A. at North Coles Levee field, now digging below 13,300 ft.; and Richfield B-1 San Emidio in Pleito field, now below 13,590 ft.

Pacific Western Oil Corp. has acquired an undivided half interest in a 1,400-acre block in Temblor Hills area of Kern County and will deepen a 4,516-ft. dry hole to test the Eocene.

Negotiations for the project involved Southern California Petroleum Corp., Jasper Petroleum Co., and St. Anthony Oil Corp., which jointly drilled the abandoned 1 St. Anthony-Jasper-Hagood. If the deepening is successful, the three companies will share with Pacific Western cost of completion and costs of further development of the lease block.

CAT CRACKER AT ARKANSAS CITY

Chicago Bridge & Iron Company furnishes reactor and regenerator



A 9-ft. 6-in. diam. by 34-ft. 6-in. reactor and a 15-ft. diam by 38-ft. 6-in. regenerator were fabricated in our Chicago plant for this UOP Catalytic Cracking Unit at the Kanotex Refining Company's refinery in Arkansas City, Kansas. It has a capacity of 4,600 bbls. per day and produces gasoline and heating oils from gas-oil.

Chicago Bridge & Iron Company builds reactors, regenerators, refinery towers, Hortonspheres, Hortonspheroids, Horton Floating Roofs, Vaporspheres, Vaportanks, Hortondome Roofs, and other welded steel plate structures for the petroleum industry. For information, estimates or quotations, please write our nearest office. There is no obligation on your part.

CHICAGO BRIDGE & IRON COMPANY

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

Atlanta, 3 ..... 2154 Healey Bldg.
Birmingham, 1 ..... 1536 North 50th St.
Boston, 10 ..... 1025—201 Devonshire St.
Chicago, 4 ..... 2128 McCormick Bldg.
Cleveland, 15 ..... 2204 Midland Bldg.
Detroit, 26 ..... 1514 Lafayette Bldg.
Havana ..... 402 Abreu Bldg.
Houston, 2 ..... 2119 C & I Life Bldg.
Los Angeles, 17 .. 1523 General Petroleum Bldg.
New York, 6 ..... 3347—165 Broadway Bldg.
Philadelphia, 3 .. 1615-1700 Walnut Street Bldg.
Pittsburgh, 19 ..... Aiena Bldg.
San Francisco, 4 ..... 1554—200 Bush St.
Seattle, 1 ..... 1325 Henry Bldg.
Tulsa, 3 ..... 1606 Hunt Bldg.

REPRESENTATIVES AND LICENSEES

Horton Steel Works, Limited, Fort Erie, Ontario, Canada
Ateliers et Chantiers de la Seine Maritime, Paris, France
Constructions Metalliques de Provence, Arles-sur-Rhone, France
Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela
Comprimo N.V., 21, Amstel, Amsterdam (C) Netherlands
Compagnia Tecnica Industrie Petroli, Rome Italy
Whessoe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Sociedade Chibridge de Construcoes Ltda., Av. General Justo, 275, Grupo 306, Rio de Janeiro, Brazil

Creole's '53 Plans

Company will make capital outlay of $100,650,000 this year, will drill 260 wells, erect new office building

CAPITAL expenditures of Creole Petroleum Corp. for 1953 are estimated at $100,650,000, an increase of about $4,250,000 over 1952, A. T. Proudfit, company president, told stockholders in New York last week.

Of the total expenditures, 54 per cent will come from depreciation, retirements, etc., and the balance from earnings. In the first quarter of this year, estimated earnings amounted to $52,300,000 against $56,500,000 in the corresponding 1952 period.

Proudfit said Creole proposes to maintain the most aggressive exploration program possible within the limits imposed by existing concessions, available personnel, equipment, and practical geological considerations. Present plans, he said, call for drilling 260 wells, including 42 exploratory tests.

Included in this total are wells to be drilled by other companies in which Creole participates. In 1952 the company drilled 329 wells. Proudfit also said Creole will carry on the long-range conservation projects initiated previously to increase ultimate recovery and to obtain maximum utilization of the resources from its concessions.

The second Ule-Amuay pipe line was completed on schedule, the Creole president reported. The pressure test was made March 18, and pumping started the same day at a 60,000-bbl. daily rate. When additional pumps are installed at Ule, the two lines will have a capacity to carry 515,000 bbl. daily of medium and light oils.

Because the company's offices in Caracas are entirely inadequate, the company has started construction on the new office building planned since 1945. The structure will cost approximately $7,500,000 and should be completed during the early part of 1955.

Imports report . . . Proudfit told the company stockholders that he found it "almost impossible to conceive" that the U. S. Congress would jeopardize the producing capacity of Venezuela — which has the largest crude reserves in the hemisphere outside the United States—by enacting the currently proposed restrictions on oil imports. He said it has been estimated that the restrictions would reduce Venezuela's crude production by some 400,000 bbl. daily with a loss of something over $100,000,000 in annual revenue to the Venezuela Government, or about 20 per cent of its total annual income.

"I feel I should also report that the public reaction in Venezuela has been one of incredulity," he said. "Our good friends there find it hard to believe that the United States—with whom Venezuela has a long unbroken tradition of friendship—would threaten the principal source of revenue with which they have done so much in recent years to raise living standards.

"This feeling is all the more pronounced because only late last year the United States concluded a new trade agreement with Venezuela, the principal advantage of which was a lowering of U. S. import duties on Venezuela's oil. Restrictive quotas now would contravene the letter and spirit of this international obligation."

Argentina Increases Imports

Imports of crude oil and products into Argentina averaged about 112,500 bbl. daily in March as compared to 103,500 bbl. daily in February and 98,500 bbl. daily in March 1952.

Principal import in March of this year was crude oil which made up about 72,000 bbl. daily of the total.

ARGENTINA'S PETROLEUM IMPORTS
(In metric tons)

	March 1953	March 1952
Fuel oil	136,403	229,750
Crude	298,527	178,183
Avgas		5,100
Diesel	15,195	4,621
Gas oil	6,444	
Naphtha	19,819	
Total	478,348	417,654

Colombia Strike Completed

International Petroleum Co., Ltd., has announced that a well located 9 miles northwest of its Colombia discovery, Totumal 1, has been completed as a producer of 35° to 37°-gravity crude.

The well tested a new horizon in the Cretaceous at 5,700-6,400 ft., which, after acidizing, flowed at the rate of 210 bbl. daily on ¼-in. choke for 24 hours with 400 psi. tubing pressure. Drilling in this shallower area will be continued, as well as in the immediate vicinity of Totumal 1, the company said.

Earlier unofficial reports on the discovery, known as the Aguachica well, credited it with a flow of about 800 bbl. daily *(The Oil and Gas Journal, May 18, page 228).*

MIDDLE EAST

A.I.O.C. Loses Round

Tokyo court says it cannot judge Iran's nationalization

ANGLO-IRANIAN OIL CO., LTD.'S application for an injunction to halt the sale of the first cargo of Iranian oil shipped into Japan was rejected May 27 by a district court in Tokyo.

The ruling was largely on jurisdictional grounds. The court held it was not competent to pass judgment on the acts of a foreign state, in this case the nationalization laws of the Iranian Government.

It was the second setback in foreign courts for the British-owned company. Early in March, an Italian court refused Anglo-Iranian's request to impound the first Iranian oil shipment into Italy. This case is now before a higher Italian court.

At stake in the Toyko suit was about 125,000 bbl. of products landed in Japan early in May in the tanker Nissyo Maru by Idemitsu Kosan, an independent Japanese distributor.

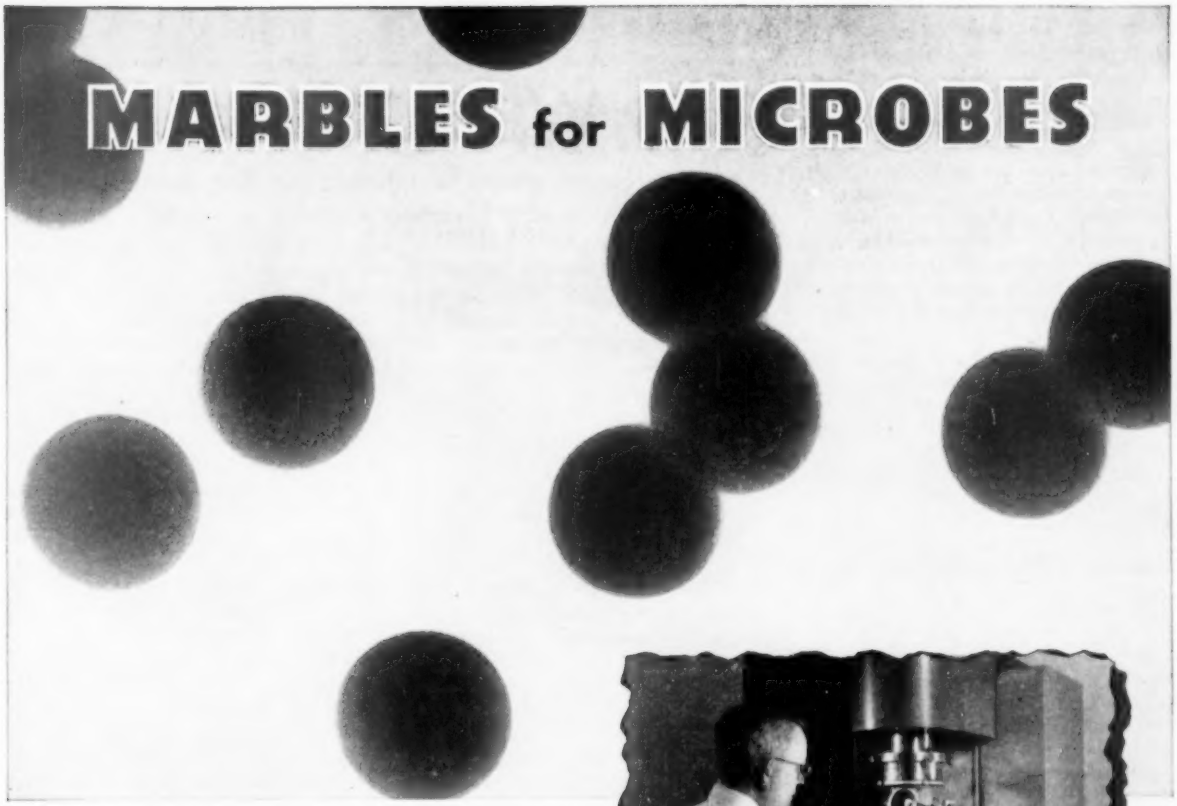
After the court ruling, Idemitsu announced that the oil which has been held in storage at Kawasaki will be turned over to distributors immediately. Anglo-Iranian filed notice of appeal, but the general legal view was that the higher court would uphold the decision.

Although the Japanese Government has indicated it will halt future Iranian oil purchases through its control of currency allocations, Idemitsu has a large credit which it has said it will use to continue the Iranian shipments. Last week Idemitsu disclosed that even after its currency credit is exhausted, it will attempt to continue the trade by bartering Japanese goods for oil.

Ball Retained by Turkey

The Turkish Government has announced that Max Ball, Washington consultant, has been retained to assist in the preparation of a petroleum law

MARBLES for MICROBES



Above—100,000X enlargement of latex spheres used to calibrate electron microscope in Nalco Laboratories. Actual diameter of spheres is 0.25 microns—.00000975 inches! *Right*—Inserting specimen holder in vacuum chamber of Nalco electron microscope.

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PERHAPS even too small to make good marbles for microbes, these tiny spheres help Nalco Scientists in their investigations of the microscopic realms of matter only recently made visible to the human eye by the electron microscope.

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Nalco WATER TECHS

New reprint of A.S.M.E. Paper No. 52-A-30: *Experimental Studies of Boiler Tube Metal Temperatures: Effect of Heat Transfer Rate and Deposit Thickness*, gives technical data on high-heat-transfer-rate effects (140,000 to 300,000 Btu/sq. ft./hr.) at pressures from 250 to 2500 p.s.i. 16 pages, with tables and diagrams. Author: C. Jacklin, Director, Engineering Research, National Aluminate Corporation.

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which will implement the country's new policy of allowing private-capital participation *(The Oil and Gas Journal, May 11, page 91)*.

Sitki Yircali, a government minister, said in Ankara that Ball would deliver a proposed draft law to Turkey in July for consideration by the assembly at the session convening in November. He said the law would be based on principles "flexible enough to give private enterprise an opportunity to work and at the same time consider Turkey's interests."

Shell, Jersey Standard, and Socony-Vacuum now have geological parties doing reconnaissance work in the southeastern part of the country. American Overseas Exploration, Ltd. (Caltex) is expected to send a party to the country in the near future.

Aramco Finishes Bahrein Line

By the completion of construction of 16.4 miles of 12-in. loop for a submarine line from Al Khobar on the Saudi Arabian mainland to Bahrein Island in the Persian Gulf, Arabian American Oil Co. has filled the link in previous looping. Consequently Aramco now has two parallel lines along the 33.3 mile route from the Dhahran, Saudi Arabia pipe line junction to the Bahrein Petroleum Co. refinery on Bahrein Island. Land sections of the route total 16.9 miles.

Throughput of the Dhahran-Bahrein line is currently 185,000 bbl. per day. With additional pumping equipment and steam power, the capacity will be increased to the limit of allowable pressure of the pipe for 195,000 bbl. per day by the middle of 1954. Approximate capacity of the Bahrein Petroleum Co. (Caltex) refinery at Awali, Bahrein Island, is 215,000 bbl. per day. Crude oil production of Bapco on Bahrein Island is approximately 30,100 bbl. per day.

Yemen Interested in Oil

The Yemen Government has indicated to diplomatic officials in Washington that it would welcome a study of the country's oil possibilities by American operators.

Although a quarter century ago there was some interest in the country and Shell drilled one wildcat on an Island in the Red Sea off the coast and later American interests conducted a test in the mountains, there have been no recent efforts to make any intensive search for oil

Yemen, one of the most populous areas on the Arabian peninsula, lies southwest of Saudi Arabia and north of Aden.

AUSTRALIA

Plant Work Pushed

Anglo-Iranian pours foundation for first permanent unit of its 60,000-bbl. Kwinana refinery in western Australia

SITE preparation for the new Anglo-Iranian Oil Co., Ltd., 60,000-bbl.-daily refinery in western Australia has now been largely completed, and foundations have been poured for the first permanent structure.

The refinery, due to come on stream in 1955, will supply the equivalent of about 40 per cent of Australia's requirements. Facilities will include two atmospheric distillation units, vacuum distillation, catalytic cracking, Hydrofining, and Platforming *(The Oil and Gas Journal, December 22, page 345)*.

According to a recent progress report by the company, most of the refinery area has been cleared and the 4-mile perimeter fenced. About 9 miles of permanent roads have been built, and surfacing will be done towards the end of the main construction period after consolidation.

Dredging proceeding . . . The 950-acre site is at Kwinana, on Cockburn Sound, near Fremantle. Since January, two Dutch self-propelled suction dredgers have been working 22 hours a day cutting a deep shipping channel at the sound's entrance. About 7,000,000 cu. yd. of sand must be removed to provide a passage 38 ft. deep and 500 ft. wide. This work is being done by the government of western Australia through a firm of Dutch dredging contractors.

Prime contractors for the refinery project are M. W. Kellogg Co. and its subsidiary, Kellogg International Corp., London. Construction has been subcontracted to a group of British firms which have established a subsidiary company in Australia known as the Kwinana Construction Group representing Costain-John Brown, Ltd., D. C. & William Press, Ltd., and Kinnear Moodie, Ltd.

Since last October, more than 9,000 tons of construction material and equipment and nearly 2,000 tons of material for installation have arrived at Fremantle from the United Kingdom, the United States, and eastern Australia. This has been moved to the site by road. About 75,000 tons of material and equipment will pass through Fremantle before the project is completed. Kellogg is handling procurement.

Estimated cost of the entire project is £A40,000,000, or about $90,000,000. Orders have already been placed in Britain, the United States, and Australia for the equivalent of more than $17,000,000. Australian orders, including piping and bar steel, exceed $4,200,000. Materials costing $9,500,000 are on order in the United Kingdom.

Activity to increase . . . As much as possible of the refinery work will be done by Australian firms and Australian workers. The total number of workmen employed will steadily rise to a peak of about 3,500 by early next year. A concrete-batching plant is being erected, and as soon as it comes into operation, the pouring of foundations will be speeded.

High-frequency radio has been installed to provide communication between some of the 40 marine craft and the shore during the building of the jetties. Radio communication between key vehicles and various buildings and the central headquarters on the site is planned.

Work on a 550-ft. temporary jetty was started in January. From this, barges will carry into position the precast sections of the 1,700-ft.-long tanker jetty. The Western Australian State Housing Commission has started work on a new town about 2½ miles from the refinery site. One thousand houses are scheduled for completion by November 1955.

Exploration Work Set Back

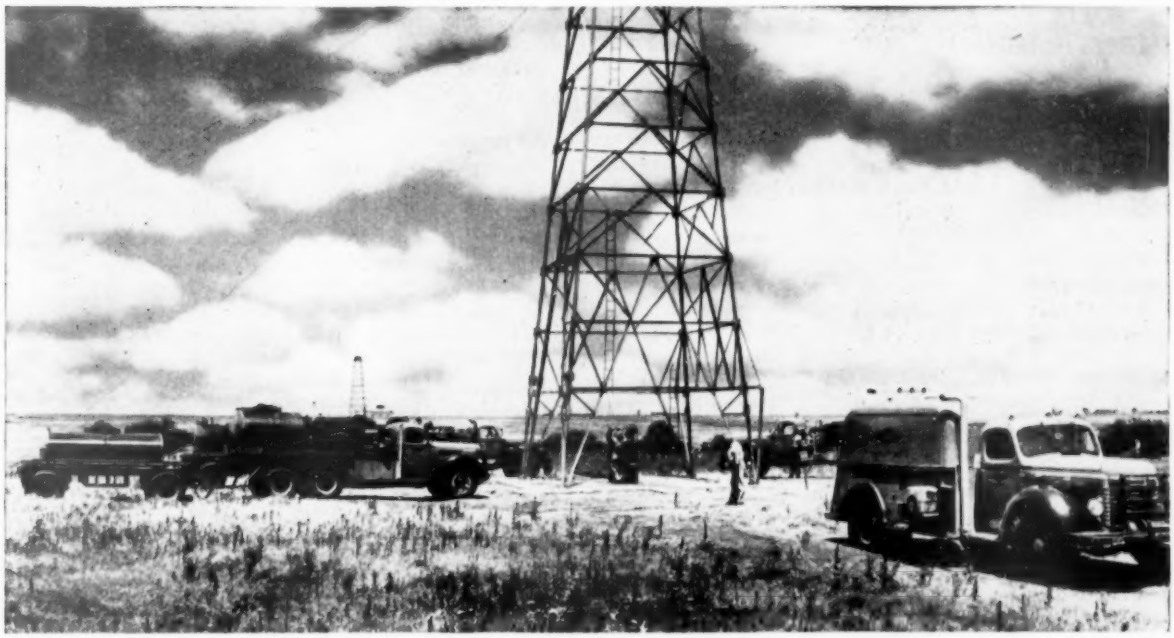
The exploration program being carried out in western Australia jointly by Caltex and the Australian company, Ampol, suffered a slight setback recently when a severe hurricane swept across the region and damaged the camp.

Field headquarters for the operation had been set up at Learmouth on Exmouth Gulf at the site of an old military camp. A heavy-duty rig capable of reaching 16,000 ft., other drilling equipment, a small field laboratory, refrigeration, food and other supplies for a camp of 50 men had been brought in by landing craft.

The hurricane brought 114-mile winds and 14 in. of rain in an area which normally only receives a frac-

SELECTIVE ACIDIZING SOLVED DIFFICULT RECOMPLETION

Production increased from 10 to 120 BOPD following acidizing workover



A problem existed in this newly deepened well: How to acidize the bottom zone while the depleted upper sections remained exposed in the open hole. It was recognized that an acid treatment by conventional methods probably would not be successful.

For this reason, it was decided to use the Dowell Electric Pilot on the job. The Selective Acidizing electrode was seated at the bottom end of the tubing string just above the new pay zone. Two pumps were used at the surface, one on the tubing and the other on the casing. Acid was pumped down the tubing, oil was pumped down the casing. The acid-oil interface was adjusted to the electrode level and maintained throughout the treatment by altering the pumping rates at the surface. This provided positive indication that the acid entered the lower zone.

As a result, production was increased from 10 BOPD to 120 BOPD.

If you would like to know more about Dowell's Selective Acidizing, the Electric Pilot, and the many other Dowell oil field services available to you, be sure to call the nearest Dowell office. Or, if you prefer, write directly to Tulsa, Dept. C 11-1.

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tion of this amount annually. The damage was mainly to the camp facilities. There were no injuries, the drilling equipment was undamaged, and the records saved. This part of Australia is virtually uninhabited except for widely separated sheep ranches.

Despite the loss of much of the camp, the company is going ahead with plans to put down its first well probably sometime this summer.

FAR EAST

Plans Clarified

New Caltex firm to build 10,000-bbl. Indian plant

FURTHER details have been made public on the contract between the Indian Government and the Caltex organization under which the company will build a new 10,000-bbl. daily refinery on the East Coast of India.

K. R. Reddy, production minister in the Indian Government, recently told the Parliament that in addition to the assurances against nationalization for a period of 25 years *(The Oil and Gas Journal, April 6, page 79)*, Caltex (India), Ltd., would be allowed to make its own arrangements for the import of crude oil and for the distribution of refined products in India and to export any of the refinery production not needed for the local market.

The plant will be built at Vishakapatnam with construction scheduled to start in 1955. Caltex gave assurances to the government that it would spend Rs 1,500,000 ($315,000) to provide employe housing, that surplus byproducts from the refinery would be made available to Indian chemical industries, that tankers of countries discriminating against India would not be used, and that Indian Government tankers would be used if required.

Personnel pledge . . . The company also pledged itself to take adequate steps to train Indian personnel, subject to the right of management to select them, and to use Indian crude oil provided it is available in sufficient quantity and suitable for processing.

The new refinery, Redd said, would be owned and operated by a public company to be organized by Caltex under the Indian Companies Act with an issued capital of Rs 75,000,000 ($15,800,000). Twenty-five per cent of the capital will be offered to Indian investors.

As for product prices, the minister said Caltex would be permitted to fix the prices from time to time at any level not higher than that at which equivalent imported products could be made available. Before altering prices, the company is to consult with the government.

East Pakistan Test Dry

The Patharia 4 wildcat of Pakistan Petroleum, Ltd., in East Pakistan has been abandoned.

The company said the well failed to give any indication of oil-bearing formations and that the results of this well, together with the previous three, are considered to have disproved the prospects of finding commercial oil accumulations on the structure.

The parent Burmah Oil Co., Ltd., drilled two wells in the area before the war, one of which had encouraging show. P.P.L. resumed the exploration in 1951, but the No. 3 well was a failure at 5,411 ft., total depth. The drilling, said P.P.L., has shown the Patharia structure to be even more complexly compressed and faulted than expected.

AFRICA

Libya Rights Claimed

Leo Y. Chertok, New York, issued a statement recently in Malta claiming he had obtained exploration rights in Libya in North Africa.

Chertok told press representatives in Malta that he would be returning soon to the new North African kingdom with a contract.

Industry reports, however, are that the basic petroleum legislation in Libya has not yet been acted on, though the government has already sought and obtained advice in the United States. Several important oil companies have indicated an interest in undertaking exploration in Libya, among them Shell, Jersey Standard, and Conorada.

Chertok was last in the news in connection with foreign petroleum operations when he sued Sinclair Oil Corp., claiming Sinclair had induced the Ethiopian Government to breach an agreement with him in order to obtain its present concession. In October 1950 the Appellate Division of the New York Supreme Court dismissed the complaint and gave judgment in favor of Sinclair.

Egyptian Pact Disclosed

Southern California Petroleum Corp. has contracted with International Egyptian Oil Co., Inc., to supervise exploration and development on International Egyptian's concessions on the Sinai Peninsula.

Tyler F. Woodward, Southern California president, announced that his directors had approved the Egyptian contract and that key technical personnel is being sent from California and West Texas.

Southern California will own 10 per cent of International Egyptian's shares and hold an option to purchase additional stock. Southern California's announcement said International Egyptian is controlled by a large Swiss banking group *(The Oil and Gas Journal, May 18, page 226)*.

Three rotary rigs and other equipment are now at International Egyptian's main camp at El Shatt, 4 miles from Suez. Wayne H. Denning, United Geophysical Co., Inc., is enroute to Cairo, and it is intended that United will handle the geophysical work for Southern California under the contract. Drilling operations will commence immediately, Woodward said.

The area included in this program is understood to embrace Wadi Feiran, about 120 miles south of Suez. Standard Oil Co. (N. J.) made a discovery in that area in 1949 shortly before it abandoned its operations and left the country because of the unfavorable legal situation.

EUROPE

Antwerp Refinery Expanding

Catalytic cracking and catalytic polymerization units will be added at the Antwerp refinery of Cie. Industrielle des Petroles (Petrofina and Anglo-Iranian).

The refinery, which was opened only in September 1951, processed nearly 36,000 bbl. daily last year. The additional construction planned calls for modification of the thermal cracking unit to permit charging an additional 18,000 bbl. daily of crude.

Anglo-Iranian also announced that improvements will be carried out at three refineries in continental Europe which are owned by company affiliates. In Germany, a new distillation unit is to be installed at the Hamburg refinery which will raise daily distillation from slightly more than 13,000 bbl. daily to about 25,000 bbl. daily.

At the nearby Schindler refinery, mainly a lube and specialities plant, the production of high-quality lubricating oil will be increased by the introduction of a new furfural treating plant.

In France, plans call for construction of a 5,000 bbl. daily platformer at the Dunkirk refinery of Soc. Generale des Huiles de Petrole. This unit will be a duplicate of the one at Hamburg.

PERSONALS

Socony Official

Robert Siegel heads overseas supply firm

ROBERT SIEGEL, president of the Socony-Vacuum Overseas Supply Co., Fort Lee, N. J., has had a first-hand look at foreign producing operations during his career.

From 1920 to 1931 he was associated with Standard Oil Co. of New York, one of the predecessors of Socony-Vacuum Oil Co., Inc., of which he later became a part. He got his start in Standard's distribution department and later was transferred to gas and fuel.

Later he served Socony-Vacuum as secretary to the executive committee and as assistant manager of the foreign producing department. From 1946 to 1949 he was president of Socony-Vacuum Oil Co. of Venezuela at Caracas.

He was transferred back to New York in 1949 to become manager of the foreign producing department of Socony-Vacuum and a director of Colombian Petroleum Co. and associated Barco companies.

Two years later he assumed his post at Fort Lee, where he is responsible for supply and distribution of Middle East crude.

Siegel is a native of New York and received a bachelor of science degree from New York University.

C. M. Brecheisen, assistant manager of the central pipe-lines division of Socony-Vacuum Oil Co., Inc., in Wichita since 1951, has been appointed manager of the eastern pipe-lines division at Plainfield, N. J. He succeeds **L. R. Dickinson.**

J. E. Tribbey, district superintendent for Sinclair Pipe Line Co., has been transferred from Galesburg to Quincy, Ill.

Fred A. Hildenbrand, oil scout for Atlantic Refining Co. at Midland, Tex., has been promoted to geologist at Corpus Christi, Tex.

O. R. (Randy) Clements, formerly testing engineer for Henderson Engineering Co. at Shreveport, has been appointed process-design engineer for El Paso Natural Gas Co. at El Paso, Tex.

Burton A. Hardey, Shreveport, has been elected a director of Louisiana Land & Exploration Co., replacing **Paul T. Seashore.** The latter is retiring after having served as director, vice president, and general manager since 1931. Seashore will reside in Carmel, Calif., but will continue as a consultant to the company. **Owen F. Thornton,** vice president of the company, will become senior officer in charge of operations.

Jackson M. Barton has resigned as manager of the geological department of Deep Rock Oil Corp. to become chief geologist for Northern Natural Gas Producing Co., new subsidiary of Northern Natural Gas Co., Omaha.

D. A. YOUNG

D. A. Young, formerly refinery manager for Sinclair Refining Co. at Houston, has been elected president and chief executive officer of Sinclair Crude Oil Co. The new firm is a wholly owned subsidiary of Sinclair Oil Corp. and was organized to expand Sinclair's activities in the purchase and sale of crude oil. Other company officers are: **Alexander Johnston,** chairman of the board; and **W. C. Rhodes** and **Frank D. Gardner,** vice presidents. Headquarters will be in Tulsa.

R. E. Beatty, Jr., formerly an engineer for the Texas Railroad Commission at Houston, has been appointed a geologist for Woodson Oil Co., Fort Worth.

C. H. Hesser, field engineer for Continental Oil Co. at Sussex field, Wyoming, has been promoted to production engineer at Denver.

Charles E. Cole has been appointed chief geologist for Arkansas Fuel Oil Corp., Shreveport. He formerly was chief geologist for Cities Service Petroleum Corp. in Calgary, Alta.

G. L. Knight has joined the land and exploration department of D. D. Feldman Oil & Gas, Dallas. Since 1950 he has been division geologist for Phillips Petroleum Co. at Bartlesville, Okla. Prior to that he was district geologist for Phillips at Amarillo, Tex. He taught geology at the University of Kansas from 1925 to 1935.

Edward E. Rue has resigned from Magnolia Petroleum Co. to engage in geologist consulting and well supervision. His offices will be at Mount Vernon, Ill.

Paul M. McFadden, district superintendent for Humble Oil & Refining Co., has been transferred from McCamey to Winters, Tex.

D. F. Sandifer has resigned as district geologist for Anderson-Prichard Oil Corp. at San Antonio, Tex., to become a consulting geologist at San Antonio.

William C. Kirkpatrick has been elected to the board of directors of International Petroleum Co., Ltd., an affiliate of Standard Oil Co. (N. J.). He was assigned to Colombia as general manager of Andian National Corp., Ltd., International's pipe-line affiliate last year, and returned to International's executive offices in Coral Gables, Fla., early this year.

Louis W. Cabot has been elected vice president and treasurer of Godfrey L. Cabot, Inc., Boston, chemical manufacturing firm and producer of oil and gas. He succeeds **Ralph Bradley,** who has resigned. Until recently Cabot was managing director of Cabot Carbon, Ltd., British subsidiary of the Boston company. Bradley will continue in a part-time capacity and as a member of the board of directors. **Willard P.**

PERSONALS

Smith, for the past 5 years eastern production manager in charge of natural-gas operations in the Appalachian area, also has been elected a vice president.

G. W. POORMAN

Glenn W. Poorman has been appointed general manager of the supply department of Esso Standard Oil Co., New York. Since 1951 he has served as assistant general manager of the supply department. Poorman, who also is a director of Plantation Pipe Line Co., succeeds **H. J. Nichols, Jr.,** as general manager. The latter, an Esso director since 1946 and a director of Plantation, is retiring after 30 years with Esso.

Lloyd G. Lewis has been promoted to section head in the physics division of the engineering-research department of Standard Oil Co. (Ind.), at Chicago. He formerly was senior project physicist in the division.

Ellis T. Hammett, district engineer for Sinclair Oil & Gas Co. at Arp, Tex., has been appointed assistant foreman at Alamo, Tex.

V. H. Jones, assistant district superintendent for Humble Oil & Refining Co. at Pickton, Tex., has been promoted to district superintendent at Pickton. He replaces **O. L. Furse,** district superintendent at the new Athens district. **P. M. McFadden,** district superintendent at McCamey, West Texas division, has been transferred to the Winters district, North Texas division, replacing **F. A. Jewell,** who has been transferred to the Vernon district. Other transfers include: **M. M. Rogers,** acting assistant division superintendent of the West Texas division, to Hobbs district as district superintendent; **H. M. McCarty,** district superintendent, from West Texas to McCamey district; **C. K. Seaman,** district superintendent, from the Stanton to Wasson district; **J. F. Jeansonne,** assistant district superintendent, from the Stanton to Wink district; **George K. Myrhaugen,** district civil engineer of the Bayou Sale district, Louisiana division, to the East Texas division office at Tyler, Tex., as civil engineer; **Clifton Roy Crim,** district civil engineer, from the Stanton to the Bayou Sale district.

A.P.I. Production District Elects New Officers

Officers of the Rocky Mountain district of the American Petroleum Institute's Division of Production are shown here after their election at the annual meeting of the group in Casper. Left to right are William M. Schul, Phillips Petroleum Co., Cut Bank, vice chairman for Montana; E. N. Dunlap, The California Co., Denver, vice chairman for Colorado; J. Howard Barnett, consultant, Casper, new chairman; J. S. Leonard, Ohio Oil Co., Sidney, vice chairman for Nebraska; A. F. Barrett, Socony-Vacuum Oil Co., Billings, outgoing president; and T. A. Atkinson, Socony-Vacuum, Casper, vice chairman for Wyoming. Not in the picture are H. C. Scoville, U. S. Geological Survey, Salt Lake City, vice chairman for Utah; O. C. Arnold, Amerada Petroleum Corp., Williston, vice chairman for North Dakota; and Walter F. Forbes, Ken Corp., Casper, secretary-treasurer.

Thomas B. Burns, geologist for Lion Oil Co., has been transferred from Wichita to Denver as area geologist.

E. C. WELLS

E. C. Wells, chief petroleum engineer for Carter Oil Co., has been appointed assistant to the production manager. **Max C. Sons,** formerly assistant chief engineer for Carter in the Tulsa headquarters office, has been named chief petroleum engineer. **P. D. Baker** has been promoted from chief gasoline engineer to assistant chief petroleum engineer.

M. C. SONS

P. D. BAKER

Dr. K. C. Heald, vice president of Gulf Oil Corp. in charge of world-wide exploration and production activities and a company director, has retired from active service. He will continue to carry on certain consulting work. Last year he was awarded the Sidney Powers Memorial Medal, the highest honor bestowed by the American Association of Petroleum Geologists. He joined Gulf in 1925 and became vice president in 1945.

J. O. Richardson has been promoted to chief petroleum engineer for Hancock Oil Co., Los Angeles. He has spent the majority of his time the past 8 years as a petroleum engineer on the West Coast and served a year in that capacity in Canada.

Dan Kralis, Geological Well Service Co., Abilene, Tex., has been named temporary president of the newly organized American Association of Geological Well Logging. The organization was formed to advance and foster the science of well logging by geologists. Other temporary officers are: **S. F. Peters,** Formation Logging Service Co., Los Angeles, vice president; **Ted Morgan,** Geological Engineering Service Co., Fort Worth, second vice president; **George Warren,** Southwestern Oil Well Surveys, Abilene, Tex., secretary-treasurer. Temporary headquarters will be in Abilene.

PERSONALS

Plan 1954 A.A.P.G. Meeting

Shown making plans for the 1954 annual meeting of the American Association of Petroleum Geologists, to be held in St. Louis, April 12-16, are, left to right: Robert H. Dott, executive director of the A.A.P.G., Tulsa; Graham B. Moody, Standard Oil Co. of California, San Francisco, general chairman of the annual meeting; John Emery Adams, Standard Oil Co. of Texas, Midland, president of the A.A.P.G.; Noel H. Stearn, W. C. McBride, Inc., St. Louis, general vice chairman for the meeting; and Leslie M. Clark, Pacific Petroleums, Ltd., Calgary, A.A.P.G. vice president. This group met following a recent executive meeting in Tulsa.

J. R. Miller, for the past 3 years district geologist for Skelly Oil Co. and Pacific Western Oil Corp. at Casper, Wyo., has been placed in charge of the consulting geological-engineering offices opened there by **G. R. Roth,** Los Angeles consultant.

M. R. Wilson, Illinois district petroleum engineer for The Texas Co. at Salem, has been promoted to assistant division petroleum engineer at Tulsa.

W. D. Steinle has been promoted from petroleum engineer to assistant division petroleum engineer at Tulsa.

Fred M. Springer, mechanical-engineering trainee for Magnolia Pipe Line Co., has been transferred from Seminole to Sweetwater, Tex.

Wayne V. Jones has been appointed vice president in charge of exploration for Union Sulphur & Oil Corp., effective July 1. For the past 19 years he has been with the Mid-Continent division of Tide Water Associated Oil Co.

James O. Winston, Jr., has been elected a member of the board of directors of Brewster-Bartle Drilling Co., Inc., Houston. Winston, who is a director of Freeport Sulphur Co., was vice president and treasurer of Navarro Oil Co. from 1933 to 1942.

DEATHS

Harley R. Hinton, 75, Afton, Va., former president and director of the North Central Texas Oil Co., Inc., died recently at his home in Afton. He was one of the founders of the company and retired as president in 1929. He remained as a director until 1948.

Fred A. Lain, 69, retired Oklahoma City geologist, died May 23 at Oklahoma City.

William P. Clark, 61, Fort Worth, who had extensive oil holdings in New Mexico, died May 22 at Fort Worth.

Warren H. Wynn, 52, district geologist for Sinclair Oil & Gas Co., died at Oklahoma City May 22.

Perry J. Sweeny, 61, chairman of the board of directors of Pan American Pipeline Co., died May 23 at Galveston, Tex. He joined Standard Oil Co. (Ind.) in 1916 and remained with that and affiliated companies for 37 years.

Lewis Maurmoir, 82, retired oil field driller, died May 27 at Tulsa. He was born in Germany and came to Tulsa in 1909 from Wapakoneta, Ohio.

Chester Raymond Richards, 68, Tulsa oil-investment dealer, died at Tulsa May 23. He came to Tulsa in 1911 and joined his father, an attorney, in the oil-production business

C. J. Tighe, division gas superintendent for Stanolind Oil & Gas Co. at Casper, Wyo., died May 23 at Casper. He spent 19 years with Sinclair Prairie Oil Co. before joining Stanolind in 1948. He was superintendent of Stanolind gasoline plants at Ulysses, Kans., and Andrews, Tex., before going to Casper in 1951.

Pat Larson, 55, driller for Styck Oil Co., died May 19 at Long Beach.

M. H. Haugh, 72, who drilled the first well in the Delaware extension in Nowata County, Oklahoma, died at Nowata May 23.

James W. McLaughlin, 62, vice president of Union Carbide & Carbon Corp., died recently at his home at New Rochelle, N. Y.

George A. Dye, 70, independent operator and former vice president of Wilcox Oil & Gas Co., died May 25 at Tulsa. He came to Oklahoma in 1911 and worked as a lease scout, tool dresser, and driller. He resigned from Wilcox in 1934 to become an independent. In later years he was associated with Freeborn Engineering Co. He was a former director of the International Oil Exposition.

General view of pump station showing pump suction and discharge lines entering building near center. Handle between them is station bypass. Venturi meter is under grating in front of left door. Tall standpipes are sump-tank vents.

Extreme left pipe out of ground is upstream inlet. Downstream outlet in background under large valve handle. Operator is standing over two strainer baskets. Pump suction line enters ground directly in front of operator.

PIONEER PRODUCTS PIPE LINE

New Installations Increase Efficiency of Sun Pipe Line's Products System

Electric controls supplant those of the pneumatic type in revamping program. Diverse traffic patterns include reversals as well as one-product operation

by Paul Reed
Pipe-Line Editor

RECENT developments for increasing the effectiveness of Sun Pipe Line Co.'s products pipe-line system have a significance which can only be understood by comprehending the main features of the company's facilities. These are unique in many respects.

Sun Pipe Line's product-lines department has a basic program which provides for the movement of products from refineries at Toledo, Ohio, and Marcus Hook, Pa., to various points throughout a five-state area. Products flow from Toledo northward and eastward and from Marcus Hook northward, eastward, and westward.

A pioneering products system . . . Sun has the distinction of building one of the first of the great products pipe lines in 1930 and 1931, in the pioneering period of product pipe lining when the Keystone, Phillips, and Great Lakes systems also were constructed. Three years after its system was in operation, Sun Pipe Line Co. developed the first automatic station operation for continued service on a products pipe line.

The system handles a large range of products including gasolines, burning oils, and liquefied petroleum gases, and conducts its operations to provide for an interchange of products with other products lines.

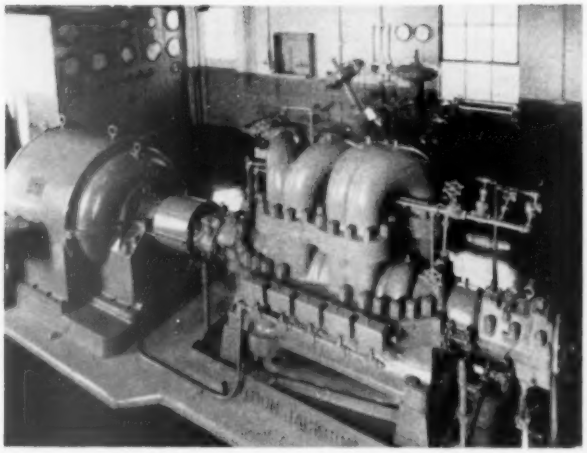
Basic traffic and operating practices of Sun Pipe Line's product lines department are described in this article.

First construction . . . The original system consisted of three connecting sections in Pennsylvania, New York, and Ohio. These sections are as follows: Twin Oaks (near Marcus Hook) to Icedale, Pa., 37½ miles, 8-in.; a north line from Icedale to Syracuse, N. Y., 245 miles, 6-in.; and a west line from Icedale to Cleveland, Ohio, 386 miles, 6-in. Also included were various spur lines to adjacent metropolitan areas.

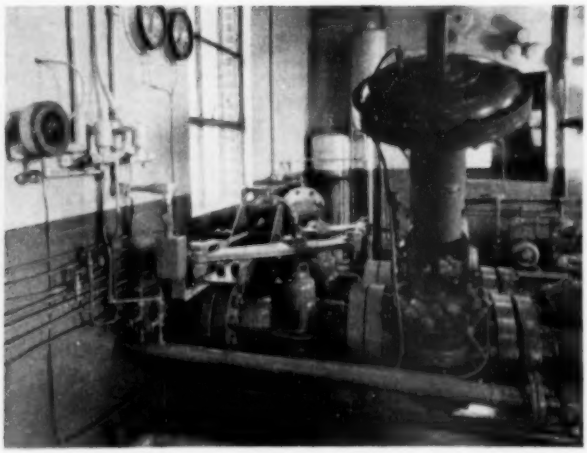
The original pump stations on the system were known as Twin Oaks, Icedale, York, Lovely, Allegheny, and Boardman, on the west line. The north line to Syracuse, N. Y., which branched off at Icedale and was powered by that station, had only one other original station at Tamaqua, Pa. Later on two more north line stations known as Ransom and Montrose were added but the former has since been abolished. In 1948 two more stations were added to the north line at Reading (Deer Path) and Wilkes-Barre (Plymouth), Pa.

West line alterations . . . Since its inception the west line has been subjected to many alterations to raise the throughput. The flow was reversed during World War II. The six primary stations were complemented in 1934 by the addition of Conestoga, Gettysburg, Fulton, Laurel Ridge, Beaver, all in Pennsylvania, and Randolph, Ohio, automatic stations. During World War II the west line underwent further revision when the flow of products was reversed in an easterly direction by the addition of stations known as Cleveland, Summit, and Mahoning, all in Ohio, and Westmoreland, Cambria, Franklin, and Bedford, in Pennsylvania. This emergency measure expired at the end of World War II and when the line was returned to a westerly flow, these six temporary stations were removed.

In 1936 the system was extended northeastward by 114 miles of 8-in.



General view of interior of pump room. Automatic control equipment is seen in center background.



Closeup of main station shutoff valves, showing hydraulic cylinder. Note limiting switch contacted by extreme left end of operating rod.

line from Twin Oaks to Newark, N. J., to supply the metropolitan New York region. Originally Twin Oaks was the only station and in order to raise the throughput, Bucks station, Pa., was added as the first booster unit followed by Montgomery, Pa., and Somerset, N. J. stations. This line remains unchanged in length and station complement to the present date.

Recent construction . . . In the past 5 years the west line has been subjected to considerable expansion. The first development came in the fall of 1948 when a 10½-mile, 6-in. spur was constructed from Inkster Junction on the Detroit Southern Pipe Line to Sun Oil Co.'s new River Rouge terminal at Detroit. The following year saw the construction of 37½ miles of 8-in. line south from Sun's Toledo refinery to Fostoria, Ohio.

The Toledo-to-Sarnia, Ont., line, 129 miles of 8-in. was the next section completed in the fall of 1951. This addition made possible the delivery of gasoline and burning oils from Toledo to the River Rouge terminal and propane to another customer on the spur as well as the shipment of butane northward to the Sarnia terminal.

The connecting link, 105 miles of 8-in. between Fostoria and Hudson (near Akron, Ohio) was built in the latter half of 1952. Planning for this link, which has pump stations at Fostoria and Hudson, Ohio, was included in the original scheme laid out for this system in 1930.

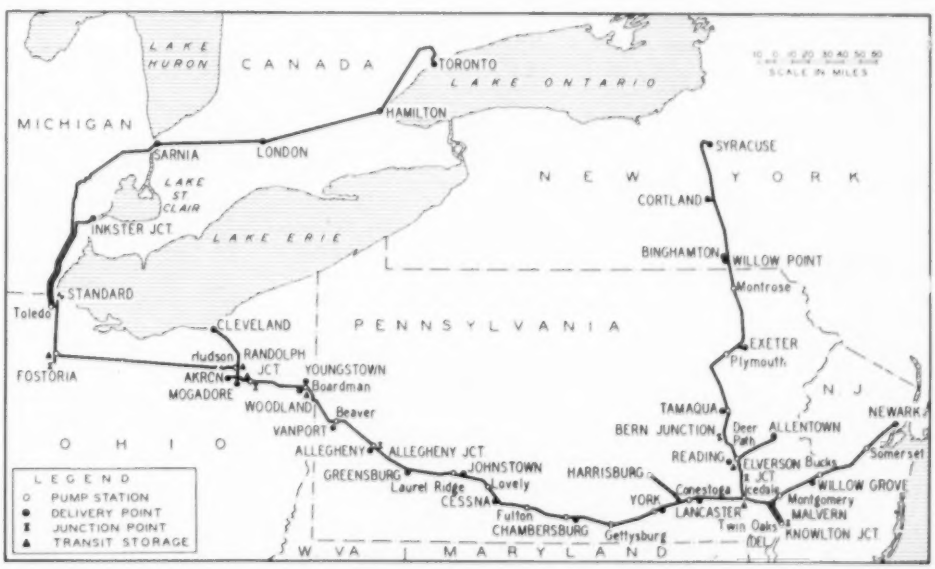
Corporate organization . . . Originally, when Sun's product system started operations in 1931, it was owned and operated by Susquehanna Pipe Line Co. in Pennsylvania, Sun Pipe Line, Inc., in New York, and Sun Oil Line Co. in Ohio. Later, in 1936, when the line was laid from Marcus Hook to Newark, Middlesex Pipe Line Co. was the owner and operator in New Jersey.

This organization remained in force until December 31, 1947, when these four companies were merged into Susquehanna Pipe Line Co., a Pennsylvania corporation, which became the owner and operator of all existing product lines.

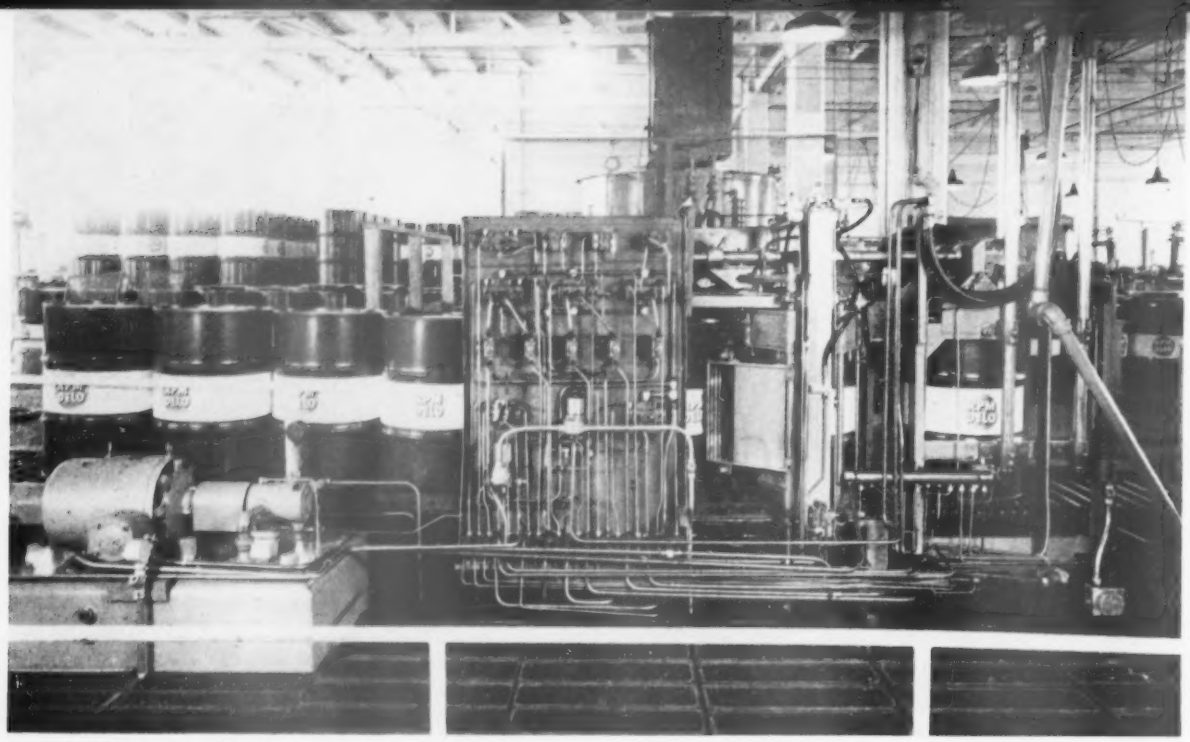
Sun Pipe Line Co. (Texas), owned and operated all crude-oil gathering and trunk lines in Texas and Louisiana. On January 1, 1952, Susquehanna and Sun Pipe Line Co. (Texas) were merged into one company—Sun Pipe Line Co., a Pennsylvania corporation, with the crude-oil lines being operated by the crude lines department and the refined product lines being operated by the product lines department. This is the present organization.

In addition to its wholly owned lines, Sun Pipe Line Co. owns an interest in Mid-Valley Pipeline Co., the recently constructed 20 and 22-in. large carrier from Longview, Tex., to Lima, Ohio; in West Texas Gulf Pipe Line Co. from West Texas to

(Continued on page 94)



Sun's products-lines department provides for movement of products from refineries at Toledo and Marcus Hook to various points throughout a five-state area. Products flow from Toledo northward and eastward and from Marcus Hook northward, eastward, and westward.



TWO BARRELS PER MINUTE . . . That is the speed of this completely automatic unit being used at Standard of California's Richmond refinery. This view is of the rear of the unit showing the hydraulic power unit and the back of the control panel with hydraulic lines. The last barrel at right is in position to be filled.

BETTER BARREL FILLING

by D. H. Stormont
West Coast District Editor

• 1,000 drums filled per 8-hour shift with one operator • greater accuracy • overfill loss reduced

FASTER, safer, and more accurate barrel filling is being accomplished by Standard Oil Co. of California at its Richmond refinery through use of a completely automatic unit designed by company engineers.

Average throughput of the machine, which requires only one operator, has been 1,000 drums (53 to 55 gal.) per 8-hour shift. The average operator at a manual filling station fills only 285 bbl. in same period, according to Standard's experience.

More accurate filling than can be performed manually likewise is being obtained. Drums vary in weight as much as 6 or 7 lb. but the weight scale used in the unit automatically compensates for the actual tare weight of each individual drum. Only the preset net weight of oil is delivered into the drum. Overfill is limited to a maximum of 1 lb., an estimated saving of 1 to 1½ lb. of oil per drum over manual methods.

Initial filling rate is at the rate of 225 g.p.m. Thus except for the first few seconds the filling lance is submerged, reducing opportunity for static spark discharge. Hydraulic and pneumatic controls used further reduce explosion hazards.

How it works . . . The two-station filler is placed in a gravity roller conveyor line which supplies empty barrels at the upstream end and carries away filled drums at the other side.

As the empty, upright barrels feed off the conveyor they first are correctly positioned for filling. Two pairs of rollers, actuated by hydraulic cylinders, move drums one at a time into the machine by grasping the top chime.

The rollers, or "gates," continue to rotate each drum while a bung locator searches for the bung. When this device, a metal finger which rides along the top of the slowly turning drum, drops into the bung a pneumatic signal stops the rotation. The control also causes the downstream gate to open so that the correctly positioned barrel can move to the filling station.

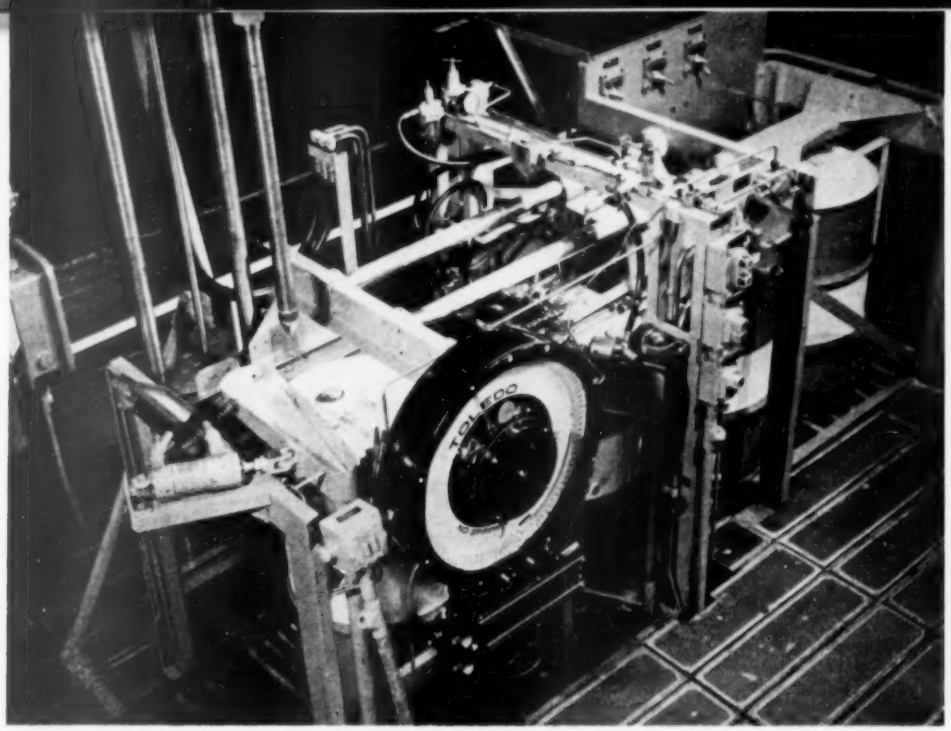
Filling of a previous drum has been proceeding simultaneously with the bung-locating operation. When the control circuit receives the signal indicating this previous drum has been filled, an overhead carriage automatically pushes the full barrel onto the exit conveyor and moves the empty onto the filling station.

Positioned on the sensitive scales, tare weight of the empty drum is automatically compensated for so that the desired net weight of lube or other oil will be delivered. Filling is accomplished through a lance automatically lowered into the drum as soon as it is moved onto the scale.

As the lance descends into the barrel a foot valve opens as the lance tip nears the bottom of the drum. Filling at first is carried out at full volume, or at a rate of about 225 g.p.m. Slots in the foot valve divert the high-pressure stream and prevent the scale from "weighing" velocity of the oil.

The lance withdraws from the filled drum and, upon reaching the top of its stroke, gives a signal which causes a drip pan to swing beneath it. This prevents any oil dropping on the top of the drums as they are being moved into and out of filling position.

At the Richmond installation only one lance was used. Thus sometimes



MORE ACCURATE FILLING . . . Weight scale automatically compensates for actual tare weight of each individual drum. Empty drums enter at right and after being filled, are discharged on the left.

it was necessary to clean the lance whenever a different oil was to be packaged. This will not be necessary in future units, however. Rucker Co., Oakland, which has been licensed to manufacture the units, has designed dual and multiple-lance setups so that the operator can readily shift from one fluid to another without danger of contamination.

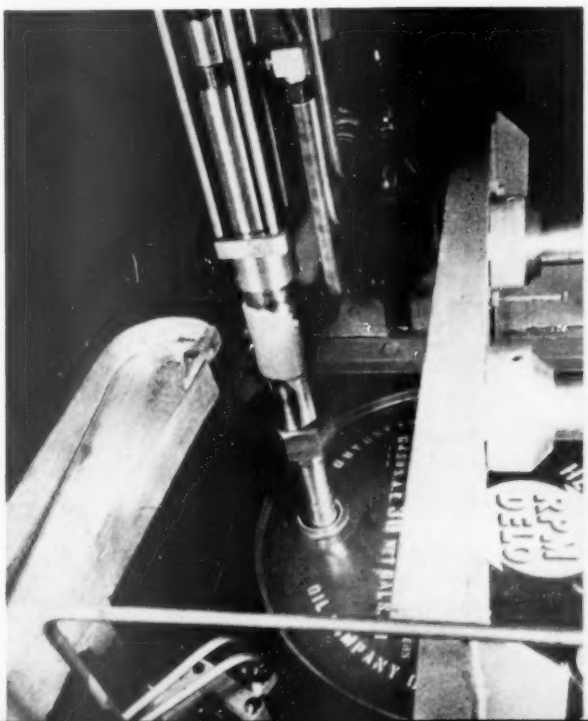
Control features . . . A few air and electrical components are used but the control circuit is primarily hydraulic. Safety interlocks incorporated to prevent spillage or machine damage in the event of interruptions in the supply of empty drums include:

1. Failure in the supply of empty drums actuates an indicator valve which allows the machine to proceed with the drum being filled and then to wait until more empties arrive. When this occurs the unit automatically resumes filling.

2. If a bottom-side-up drum reaches the machine, it merely rotates in the bung-location station until the operator notices and corrects the situation. The same is true if the finder cannot locate the bung because of the drum's odd shape, or the filling hole being improperly located. Since the carriage moving the empties onto the filling position cannot move forward until the indicator valve shows the bung has been located, the filling cycle likewise will not continue.

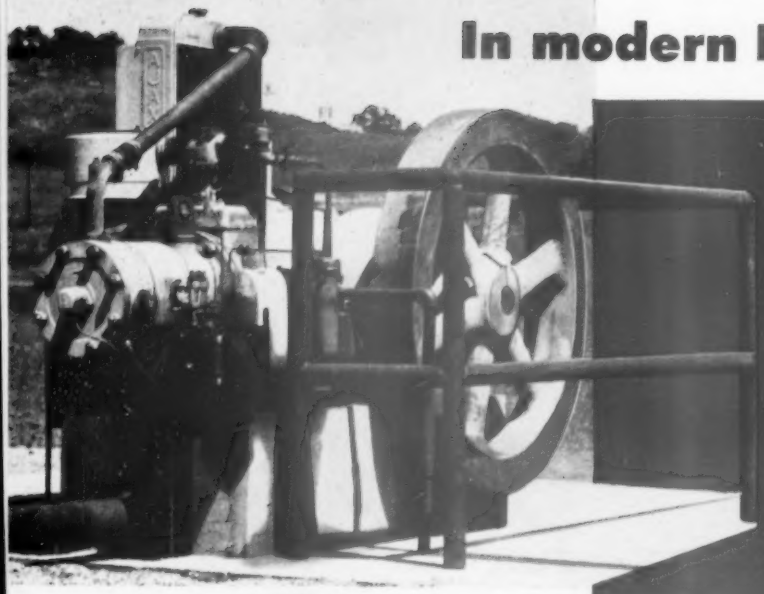
3. If the exit conveyor becomes so jammed with drums that a full drum cannot leave the filling station, interlocks quiet the machine until the flow of drums is resumed.

FILLING LANCE inserted in a drum which is sitting on a scale platform. Filling rate during the first few seconds is about 225 g.p.m. It later becomes a dribble as the drum fills and when exact net weight is reached the flow is cut off.

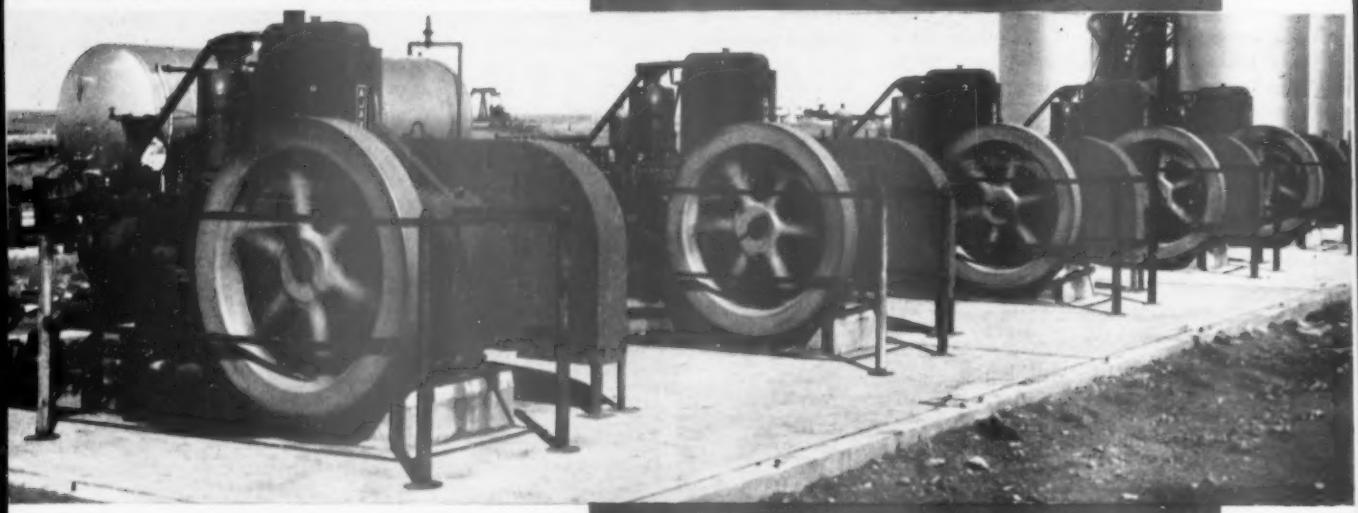


FOOT VALVE of the filling lance, normally closed when the lance is withdrawn, is slotted to divert flow of the oil. As the lance lifts from the drum the drip pan automatically swings into position as shown.

In modern Fluid Injection . . .



AJAX gets the call!



In the vital, expanding field of secondary recovery and pressure maintenance by fluid injection, Ajax Engines lead. The powerful DP-70 Model 11 x 14 shown above is the popular choice for economical, always dependable performance. Ask your Supply Man to detail the very good reasons - why!

AJAX ENGINES

AJAX Gas and Oil Engines

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AJAX IRON WORKS

Builders of Gas Engines • Steam Drilling Engines • Industrial Steam Engines

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Oil Field Distributors: THE NATIONAL SUPPLY CO., PITTSBURGH, PA.

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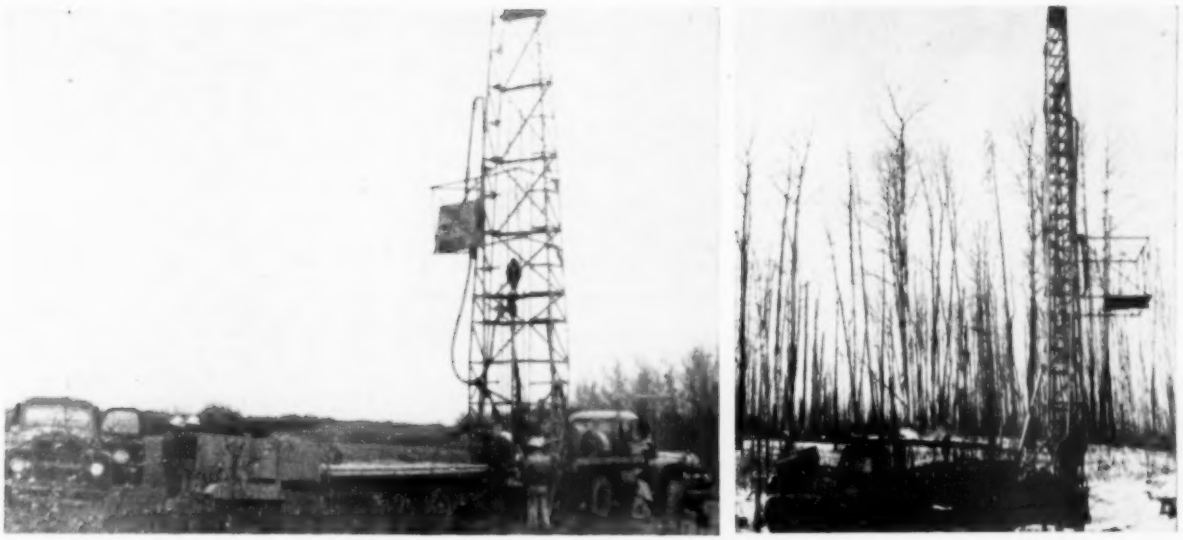


TRUCK-MOUNTED DRILLING RIGS employed for exploration drilling in western Canada. Water truck shown in left photograph serves dual purpose in transporting drill pipe on moves.

Exploration Drilling in Western Canada

by D. K. Seaman*

THE term "core drilling" is somewhat misleading as to the objective intended for this type of drilling operation. Although coring practices may be conducted in certain specific areas, the normal practice is to drill the holes for correlation electric logging.

Seismic data . . . An increasing tendency evident over the past several months is the use of these bore holes for obtaining seismic data. Often uphole velocities are observed in these wells in addition to using them for shooting reflection profiles.

These applications prove to be an economical feature for those companies which have conducted earlier seismic work in an area, or which are contemplating entering the locality and do not have available to them deep-hole velocity control. As a result of this work, many anomalous velocities have been recorded.

Problems Encountered

Most drilling problems are encountered at the surface where boulders, sand, and gravel are encountered. Since it is not usually economically feasible to run surface casing through these troublesome zones considerable difficulty often ensues. This is particularly true when lost circulation is encountered at deeper depths, allowing this gravel to slough in, sticking the drill pipe in the hole. It is also hazardous from a logging standpoint; frequently logging tools are stuck in the hole. Usually these difficulties can be penetrated by using a high-density viscous mud. However, it has been necessary at times to set cement plugs opposite these formations and then drill out the plug after the cement has hardened. In only very critical locations would it be economical to run casing through these sections.

Other problems . . . Two other problems often develop from such conditions. The holes sometimes do not stay open long enough to be logged or shot, and frequently drift considerably from the vertical. To insure that these holes are adequately flushed, the combined annular velocity and viscosity of the fluid must be adequate to carry the cuttings to the surface. A standard 4½ by 6-in. pump delivering 5 gal. (imperial) of fluid per minute in a 4¾-in. hole would move cuttings to the surface at a rate of 131 ft. per minute.

Penetration rates improved . . . Considable improvement may be obtained in flushing the cuttings by using larger pumps. For instance, the use of a 5 by 8-in. pump delivering 115 g.p.m. would provide an annular velocity of 204 ft. per minute. The rate of penetration is also greater when a larger volume of fluid is delivered through the bit.

Crooked holes result from inducing compressive load on the string by means of a pulldown or drill-pipe load in going through hard formations. Holes have drifted in some cases so that electric logs and data obtained are rendered invalid until deviation surveys are run to determine the true vertical depth of the hole. Most companies de-

(Continued on page 84)

Major Contractor

Seaman Exploration & Drilling Co., Ltd., one of the principal exploration contractors in western Canada, operates seven 1,000-ft. and two 2,000-ft. exploration drilling rigs, as well as an electrical logging unit.

An affiliate, Seaman Exploration Co., Ltd., has in operation one 1,000-ft. and a 2,000-ft. exploration rig in addition to a logging unit.

In addition to D. K. Seaman, president, officers include B. J. Seaman, vice president, and D. R. Seaman, secretary - treasurer. D. Harder and J. Thompson are drilling superintendents.

S. Hanson is secretary of the latter firm.

* President, Seaman Engineering & Drilling Co., Ltd., Calgary, Alta., Canada.

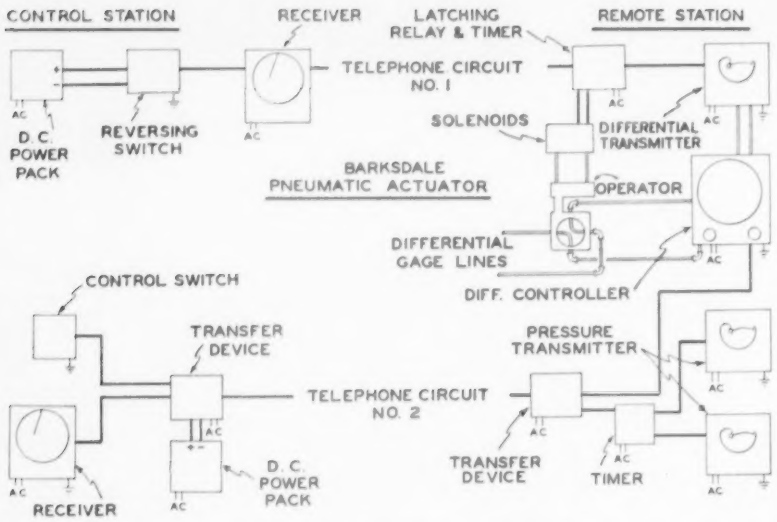


Fig. 1—Measurement and control circuits employed on Southern Counties Gas Co. system.

UNATTENDED TERMINAL INSTALLATION

Measurement and Regulation Of Flow by Remote Control

No undue service requirements have ensued during the 9 months since this station was placed in operation. All or most of the maintenance calls were occasioned by failures common to more conventional applications.

by Glen C. Wilson*

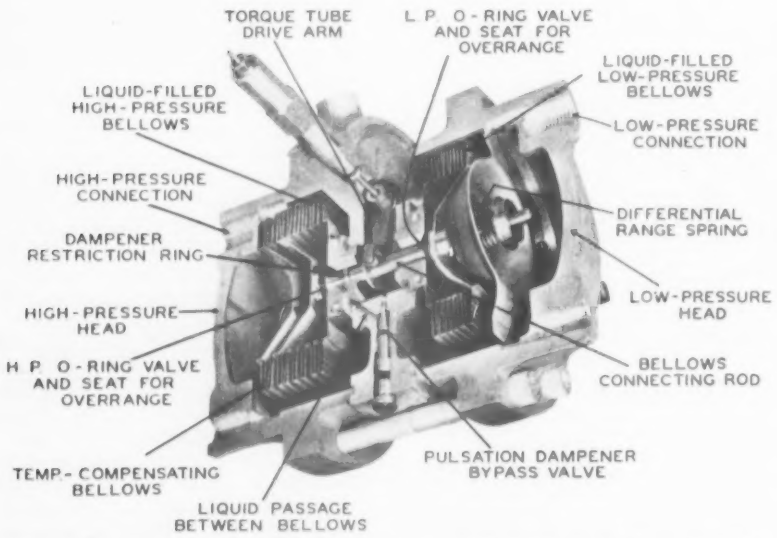


Fig. 2—Cutaway model of ruptureproof bellows-type differential-pressure measuring unit.

WESTERN TERMINAL STATION, located in West Los Angeles, is the latest of the remotely controlled, unattended installations for measurement and control along the 30-in. pipe line of Southern Counties Gas Co. which connects to El Paso Natural Gas Co. at Blythe, Calif.

It serves as a terminal to the Santa Monica area through a 16-in. connection from the 30-in. for Southern Counties Gas Co. Flow meters and regulating valves are incorporated in the line at this point, to measure and regulate the flow of natural gas to and from the 30-in. Lindley connection to La Goleta dry-gas field.

Measurement is obtained through one 8-in. primary meter and two 20-in. secondary meters. Differential limit controls actuate cylinder-operated plug valves to open or close the meters as is required.

Telemetering

Two telephone circuits, terminating at the control station which is located in the San Fernando Valley, are required to perform the telemetering and control functions.

The telemeters are of the impulse duration type. In this, the transmitter is essentially a mercury switch which is closed for an interval proportional to the measured quantity. Since it is the duration, rather than the magnitude of the transmitted signal that is important, wide variations in voltage or line resistance have no effect on the accuracy of the measurement.

One circuit is employed to transmit a signal representing the total volume through the station. Pressure differential proportional to flow is obtained by means of a segmental orifice plate welded inside a straight portion of the 30-in. line. Taps are provided on each side of this plate for connection to the differential transmitter and controller. A small four-way selector valve, equipped with a cylinder operator, is connected in the differential gage lines to reverse the gage connections upon reversal of flow. This is shown in Fig. 1.

Because a faulty operation of this valve could conceivably cause overranging and mercury loss in the conventional type of mercury manometer unit, ruptureproof bellows-type differential-pressure-measuring units were employed in the transmitter and also in the differential-pressure controller.

An additional advantage is that frequent adjustments, caused by the effect of ambient temperature changes, are eliminated. This is due to the superior thermal stability inherent in the design

*Southern California Gas Co. Presented at meeting of Southern California Meter Association.

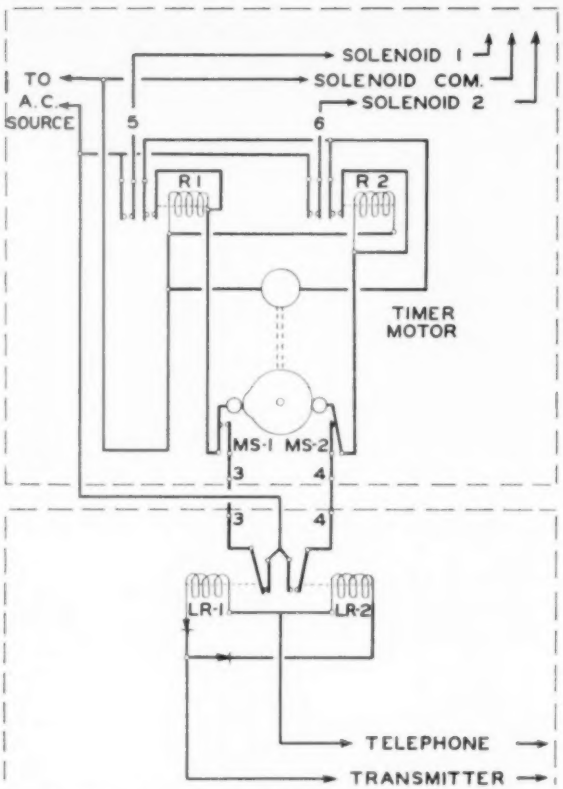


Fig. 3—Wiring diagram of polarized latching relay and impulse timer.

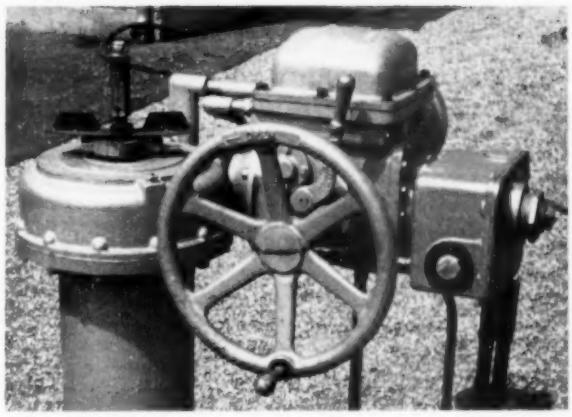


Fig. 4—Drive motor and housing for speed-reduction gears on 16-in. control valves.

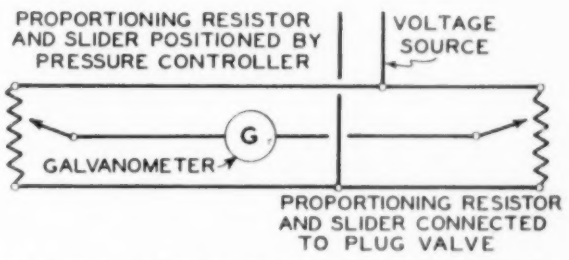


Fig. 5—Illustrating basic principle of the electric motor valve control.

of the unit. Fig. 2 is a picture of a cutaway model of the ruptureproof bellows element.

Reversing control . . . The operation of reversing the direction of control and transmitted value is unique, as it is the electrical reversal of the polarity of the transmitted signal that effects the pneumatic reversal of the gage lines to the instruments.

This is traced in the upper circuit of Fig. 1. The direct-current power supply for this circuit is located at the receiver end. The reversing switch is a double pole-double throw toggle switch arranged for polarity reversal. The receiver unit includes a magnetic clutch coil which is connected in series with the circuit. Polarity reversal has no effect on the operation, or accuracy, of the receiver.

At the transmitter end of the circuit, the latching relay and timer unit is sensitive to polarity direction due to the selenium oxide rectifiers included in the circuit. Either the latching coil, or the release coil of the latching relay, depending on the polarity, will be connected in the series circuit. Fig. 3 is a wiring diagram of this unit. The transmitter, essentially a mercury switch, completes the circuit.

To operate, the polarity of the circuit is reversed by positioning the switch and the latching relay is operated. Contacts actuated by the selected coil close, starting the timer, and energizing one of the two three-way solenoid valves.

Natural gas at 125 psig. is channeled to the proper side of the cylinder operator and the four-way selector valve reverses the gage connections. After an interval of about 30 seconds the timer disconnects the solenoid and is reset for the next cycle of operation.

Second circuit . . . The second telephone circuit is used to transmit the pressure upstream and downstream of the regulating valves, and, on option, to position the set point of the differential pressure (volume) controller.

The two pressure transmitters are connected at alternate intervals to the telephone line through a timing switch to record on a single receiver. This is shown in the lower right-hand side of Fig. 1. The identities of the two pressures are determined by the difference

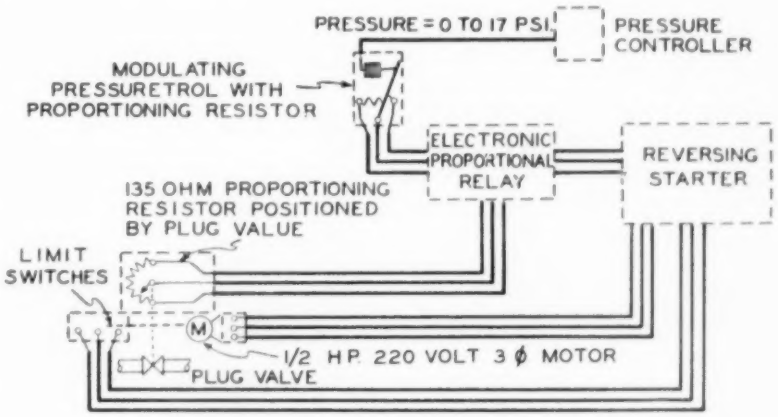


Fig. 6—Operating circuit for controlling electric motor positioned plug valve.

in the time allotted to each. As an example, in a 15-minute cycle, transmitter "A" is connected for 9 minutes, transmitter "B" for 6 minutes.

The set point of the differential-pressure controller is positioned by remote means over the same circuit used by the pressure telemeters.

Present contracts with the telephone company do not permit performing more than one function at a time over a single circuit. Consequently, to derive the maximum use of the circuit, the desired function must be selected much the same as in dialing a regular telephone number.

Circuit selector . . . In the selector, the polarity-sensitive rectifiers are used, with relays and a timer in a unit called a 'transfer device." This is a single-pole, double-throw switch, remotely operated, with time limit reset.

In Circuit 2, Fig. 1, the normal condition—that of telemetering—may be traced from the receiver to the local unit of the transfer device, over the telephone circuit to the remote unit of the transfer device, the transmitter timing switch, the transmitter, and return, which in this instance, is grounded.

When a push button in the control switch is pressed, the circuit polarity is reversed. Rectifiers at the transmitters block the flow of the reversed current. Other rectifiers in the transfer devices route the current to energize direct-current relays. These in turn cause two synchronous-motor-operated time-delay relays and several alternating-current relays to be operated.

The result of this remote-controlled switching is that, at the local end of the circuit, the receiver has been disconnected from the telephone circuit, and the control switch connected instead.

At the remote end, the timer and transmitters have been replaced by the set-point positioning elements of the differential-pressure controller.

The operator may now position the set point of the controller by pressing the appropriate push button to increase or decrease the volume through the station. This again is accomplished by polarity reversal. After an interval, selected to suit the requirement, the timers disconnect the circuit from the control function and reconnect the telemetering elements.

Control

The final control elements at this station consist of two 16-in. plug valves, positioned by electric-motor actuators. This combination was selected because an absolutely tight shutoff was desired when the valves were closed. Because the valves are buried underground, together with other station piping, noise problems common to aboveground installations are eliminated.

The two valves are designed to operate in sequence; that is, when the first valve approaches its maximum opening, the second valve starts to open. The aboveground portion of one of these valves, which includes the drive motor and a housing enclosing the speed-reducing gears, is shown in Fig. 4. Also included in the valve-control housing are limit switches and a proportioning resistor (potentiometer) which is positioned by the rotation of the valve.

This resistor is included in the drive motor control circuit as one-half of a Wheatstone bridge. The other half of this bridge is a similar slide-wire resistor which is part of a pressure-transducer unit connected to the output of the remotely positioned controller. Fig. 5 illustrates the basic principle of the motor-control circuit. The galvanometer "G" is included schematically as an unbalance detector. If the sliding arm of the controller resistor is moved, a difference in voltage will occur between the sliding arms of the two resistors and current will flow through the galvanometer causing the pointer to deflect. By moving the valve resistor a similar amount, and in the right direction, balance will be restored.

Circuit operation . . . In the operating version of this circuit, an electronic proportional relay is used instead of the galvanometer. A state of unbalance in this causes a relay in a vacuum-tube plate circuit to close; this, in turn, operates motor contactors in the reversing starter. The motor then positions the valve to the point where voltage balance is attained. This circuit is shown in Fig. 6.

Operations can be traced from the remotely positioned volume controller. If the control point is altered, a different value of output pressure will be impressed on the pressure element of the transducer thus moving the sliding contact a proportionate amount.

The resulting state of unbalance is detected by the electronic proportional relay and the circuit connecting the reversing starter is complete, starting the motor. The valve is then rotated to a position where circuit balance is restored.

Service

Since this station was placed in operation some 9 months ago, no undue service requirements have occurred. All or most of the maintenance calls were occasioned by failures common to more conventional applications. Preventive-maintenance inspections are made weekly. A more thorough inspection, including lubrication and circuit measurements, are made on a monthly basis.

Drilling in Western Canada

(Continued from page 81)

mand that deviation checks be run on these holes as standard procedure.

Practical corrective methods to insure straight holes are as follows:

- Use of heavier strings of pipe; i.e. 2⅞-in. o.d.
- Using at least one drill collar of 3½ or 3¾-in. o.d. size.
- Keeping the drill string under tensile load at all times.

The last-named is by far the most important of the above three applications and would be the safest practice to follow to assure straight holes. If a hole has been checked prior to completion and is found to be out of plumb, at least one corrective method is further to reduce the weight on the bit and increase the table speed.

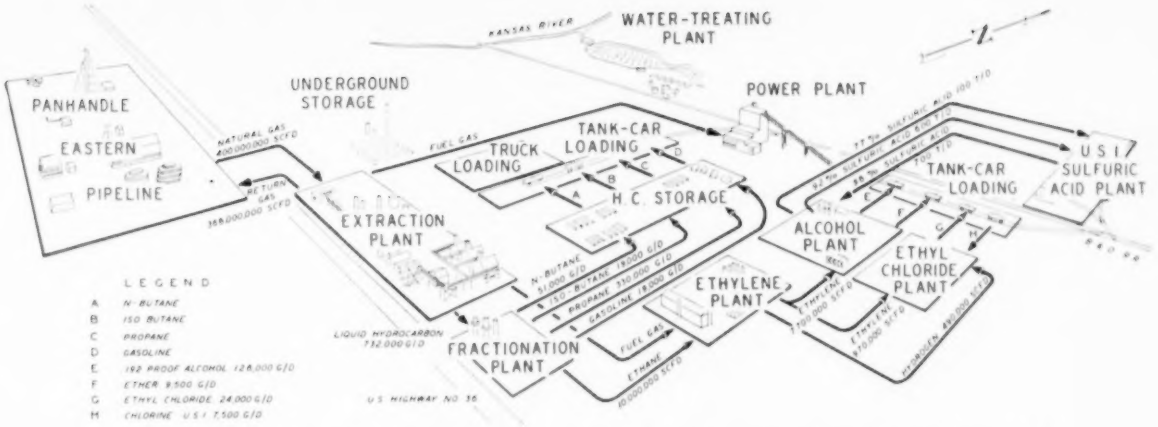
Drilling Equipment

Portable truck-mounted equipment is used in drilling to depths of 2,000 ft. with normal-size 4¾-in. diameter hole. The rig is powered by means of the truck motor through a power takeoff. In most cases the truck motor is the only source of power and also supplies the power for the mud pump. Some units are equipped with a stationary engine on the deck, which may be compounded with the truck engine for an added source of power.

Standby facilities . . . It is also advantageous at times to use a skid or trailer-mounted pump with a separate power supply so that fluid volume can be varied or reserve power made available for the deeper drilling. This latter arrangement also has the advantage of reducing the weight of each component part which would prove of valuable assistance when traveling over soft, marshy country.

Conventional-type water trucks are used and these serve a dual purpose in that they are used to transport the drill pipe on moves. Most drill pipe used is 2⅜-in. o.d. by 20 ft. in length with screwed-on tool joints. Drill collars of 3½ to 3¾-in. are commonly used with only one per string.

Bit selection . . . Bit selection varies considerably among contractors, but most hole is made with drag bits of the finger type or replaceable-blade type. These are usually rebuilt at approximately half the original cost of the bit and may be rebuilt several times before discarded. A wide selection of roller-type bits are used in two-cone and tricone styles, dependent upon the particular type of formation encountered.



SCHEMATIC FLOW DIAGRAM of all operations at Tuscola, Ill., home of National Petro-Chemicals Corp. Fig. 1.

PETROCHEM REPORT

Ethyl Alcohol and Ethyl Chloride

. . . from natural gas

by David J. Stark*

THE Tuscola, Ill., plant of National Petro-Chemicals Corp. is designed to process a maximum of 425,000,000 cu. ft. of gas per day. From this stream 10,000,000 cu. ft. per day of ethane will be extracted for cracking. Ethylene thus produced will be synthesized to produce 40,000,000 gal. per year of ethyl alcohol and 50,000,000 lb. per year of ethyl chloride. A flow sheet of the plant is shown in Fig. 1.

Natural gas is delivered from the Panhandle Eastern Pipe Line to the hydrocarbon extraction unit. The gas is dried to prevent freezing equipment in the low-temperature extractive process. Ethane and heavier hydrocarbons are absorbed and are separated from the methane and nitrogen present in the natural-gas stream. The major portion of the natural gas is returned to the compressor station for transmission up the pipe line.

The recovered liquid hydrocarbons are then separated into ethane, propane, isobutane, normal butane, and natural gasoline in the fractionation unit. Propane, normal butane, isobutane, and natural gasoline are routed to storage for shipment. Underground as well as surface storage has been provided for propane. The ethane fraction is sent to the ethylene unit as a vapor.

*Engineer, National Petro-Chemicals Corp. Presented at annual meeting, Natural Gasoline Association of America, Houston, April 30-May 1, 1953.

Ethane production . . . Ethane is cracked at high temperature and low pressure to produce 8,670,000 cu. ft. per day of ethylene and 490,000 cu. ft. per day of hydrogen. Separation of these two components is accomplished by fractionation and low-temperature separation respectively.

A portion of the ethylene, 7,700,000 cu. ft. per day, is routed to the alcohol plant. Here the olefin is contacted with high-strength sulfuric acid followed by hydrolysis and separation of the low-strength acid and crude alcohol. The crude alcohol is fractionated to recover 192-proof alcohol, ether, and byproduct components. Recovered low-strength sulfuric acid is concentrated, refortified to 98 per cent strength and reused in the plant.

Sulfuric acid used in the alcohol plant is produced in the U.S.I. sulfuric acid plant. Sulfur is burned, contacted with a catalyst, and converted to sulfur trioxide. Concentrated acid from the alcohol plant is used to absorb the sulfur trioxide with resultant production of 98 per cent acid.

The remainder of the ethylene, 970,000 cu. ft. per day, is delivered to the ethyl chloride plant. Purchased chlorine and hydrogen from the ethylene plant are combined to form hydrochloric acid. Ethylene and hydrochloric acid are reacted in the presence of a catalyst to produce crude ethyl chloride. Purified ethyl chloride is recovered as a "heart cut" via fractionation.

Utilities . . . Utility requirements are met via a modern power plant. This unit contains three boilers capable of producing a total of 600,000 lb. per hour of steam at 625 psig. and 750° F. Electrical production from two generators is 15,000 kva. Compressed air is available to the plant at a rate of 1,000,000 cu. ft. per day and a pressure of 100 psig.

Water at a rate of 9,000,000 gal. per day is pumped from the Kaskaskia River into a 100,000,000-gal. reservoir. The water-treating plant prepares and filters all water transferred into the power plant, cooling towers, domestic, and sanitary systems. Effluent from the plant is treated prior to discharge into the Kaskaskia River below the reservoir intake.

Should the water in the Kaskaskia River fall to a low level, two wells have been drilled to supply 10,000,000 gal. of water a day to the Kaskaskia from a point 24 miles upstream of the plant.

Processing Units

Extraction of hydrocarbons from natural gas, at Tuscola, is carried on in the hydrocarbon recovery area. This area consists of the extraction plant and the fractionation plant.

Extraction unit . . . The extraction

plant (Fig. 2) consists of a light-oil and a heavy-oil absorption system. These absorbers will extract 40 per cent of the ethane and virtually all of the propane, isobutane, normal butane, and natural gasoline from the Panhandle Eastern gas stream.

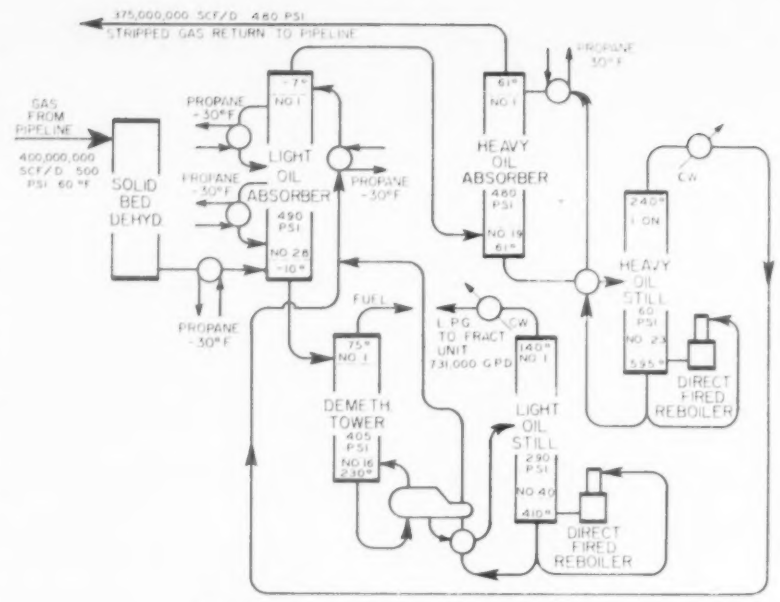
The gas is first dehydrated to a —40° F. dew point, 7 lb. of water per million cubic feet being removed. Each dehydrator tower contains a 9½-ft. bed of Sovabead packed between two 3-ft. beds of Florite. The cycle consists of a 12-hour drying period followed by a 3-hour regeneration and a 3-hour cooling period.

The dehydrated gas is cooled by exchange and propane refrigeration to a temperature of —20° F. before it enters the light-oil absorbers which operate at 490 psi. A hexane cut will be used as absorber oil and this will be chilled to —20° F. The lean-oil rate is 2,100 g.p.m., which along with the gas stream splits and enters the two light-oil absorbers operating in parallel. The heat of absorption is removed by two sets of intercoolers which are chilled by propane refrigeration. The light-oil absorbers operate at an average temperature of —8.5° F.

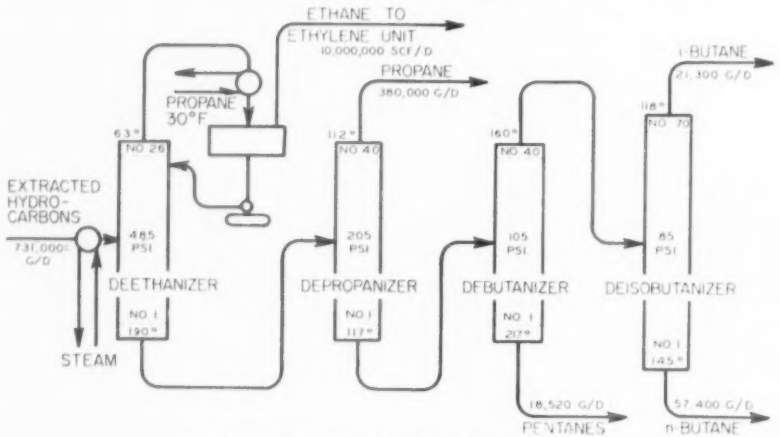
The overhead from the lean-oil absorbers enter three heavy-oil absorbers operating in parallel for recovery of the entrained light oil. The lean heavy oil employed has a molecular weight of 180. These absorbers will operate at a pressure of 480 psi. and a temperature of 60° F. The lean heavy oil is cooled to 50° F. and charged to each absorber at a rate of 180 g.p.m. The stripped gas overhead is returned to the Panhandle Eastern compressor station.

The rich oil from the heavy-oil absorbers flows to the heavy-oil still where the light and heavy lean oils are separated. Reboiler heat is supplied by a direct-fired heater with a duty of 50,000,000 B.t.u. per hour. The hot heavy lean oil is used to preheat the feed to the heavy-oil still, supply intermediate reboiler heat to the light-oil still, and also to heat the regenerating gases to the dehydrators. The recovered light oil is condensed overhead and returned to the light-oil circuit.

Demethanizer . . . Rich oil from the light-oil absorbers goes to a demethanizer operating at 405 psi. The purpose of this tower is to remove the methane which is passed through a reabsorber and a preabsorber for marginal recovery of ethane and propane prior to return to stripped gas. However, these have not been shown on Fig. 2 in order to simplify the diagram. Two kettle-type reboilers which supply the stripping vapors operate in parallel and are heated by a 410° F. stream of light lean oil.



SIMPLIFIED FLOW of extraction unit. Fig. 2.



SIMPLIFIED FLOW of fractionation unit. Fig. 3.

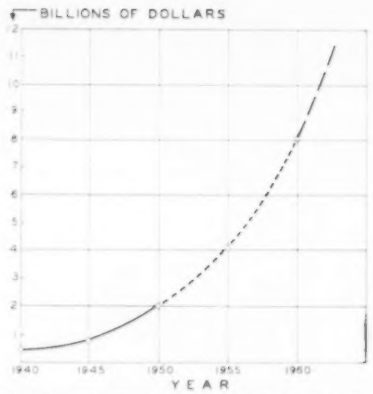
The final step is the separation of the extracted L.P.G. and the lean light oil. This operation takes place in two light-oil stills operating in parallel. The L.P.G. is condensed overhead by water cooling and is sent to the fractionation unit for separation. The lean light oil is cooled by exchange before returning to the light-oil absorbers. Each light-oil still is supplied with direct-fired reboiler heaters, supplying a total of 62,000,000 B.t.u. per hour. In addition, extra heat is furnished from the feed preheater and the intermediate reboiler.

Refrigeration . . . The refrigeration cycle will involve the vaporization of liquid propane in the refrigeration exchangers, followed by compression and condensation of the vapors. In normal operation, two 2,000-hp. centrifugal compressors operating at 7,500 r.p.m. will provide a refrigerating capacity equivalent to the manufacture of 4,850 tons of ice per day. The compressors will be driven by steam condensing turbines. Refrigeration is carried out at various cooling levels as for instance —30° F. on light lean-oil coolers and +27° F. on the heavy lean-oil chiller.

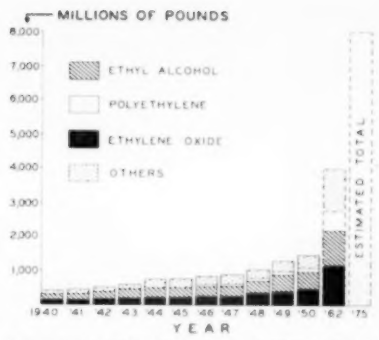
Propane at the respective saturation temperatures and pressures is vaporized into various stages of the same machine rather than having separate compressors. Separate suctions are provided for each of five stages, —30°, —20°, 27°, 48°, and 70°.

Utility and compressor requirements for the efficient operation of the extraction units are as follows:

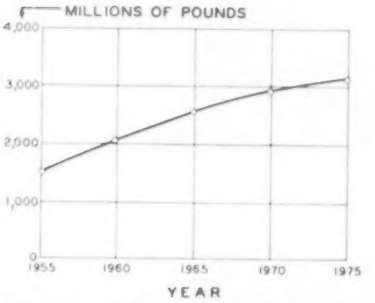
Commodity and unit—	Volume
Cooling water (circ.), gal. per day	34,560,000
Heat input, B.t.u. per day	3,000,000,000
Steam, lb. per day	96,000
Compressor load, hp.	4,000
Electricity, kw.	2,400



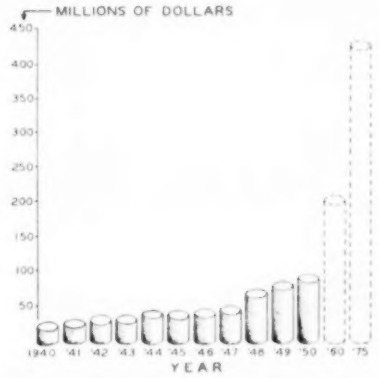
Capital investment in the petrochemical industry.



Consumption of ethylene by the petrochemical industry.



Estimated production of ethylene from natural gas.



Value of ethylene consumed by the petrochemical industry.

The petrochemical industry doubled itself each 5 years in the decade, 1940 to 1950. To date the major building block for this industry has been ethylene, recovered from refinery cracking off gases and produced directly by thermal cracking of various petroleum stocks. These graphs show the growth of the petrochemical industry to date and corresponding increase in consumption of ethylene during that time. Also shown are predicted values for future petrochemical requirements.

Fractionation unit . . . The fractionation unit (Fig. 3) will be charged with hydrocarbons at the rate of 731,000 gal. per day from the extraction unit. These hydrocarbons consist mainly of ethane and propane, with lesser amounts of butane and natural gasoline. The hydrocarbons are separated in a series of four towers.

The cold feed is preheated to 125° F. before entering the deethanizer tower. This tower contains 26 trays and will operate at 485 psi. Part of the overhead will be condensed for reflux purposes. The net make of ethane (95 per cent purity) will be sent to the ethylene unit as a vapor. Propane refrigerant (30° F.) will be used on the overhead condensers.

The deethanizer bottoms flow under tower pressure to the depropanizer which will operate at 205 psi. Propane will be removed as the overhead product and sent to storage. The depropanizer tower has 40 trays and the propane will have a minimum purity of 96 per cent. The bottoms make is pressured to the debutanizer tower.

The debutanizer tower will separate the butanes from the natural gasoline with the latter stream going to storage. The butane fraction is separated into isobutane and normal butane in the final tower which is the deisobutanizer. The deiso tower has 70 trays and will make a minimum of 95 per cent purity isobutane.

All of the fractionation towers are equipped with kettle-type reboilers. The reboilers are heated by 65-psi. steam with the condensate being returned to the power plant. With the exception of the deethanizer tower, the overhead condensers are cooled with 83° F. water.

Conventional instrumentation schemes are being used to control pressures and temperatures on the towers. However, a graphic-panel type of control board will be used. In addition, the control room will be air conditioned.

The volumes of the material recovered are:

Products—	Volume
Ethane, cu. ft. per day	10,000,000
Propane, gal. per day	380,000
Isobuane, gal. per day	21,300
N-Butane, gal. per day	57,400
Gasoline, gal. per day	18,520

Utilities required for operation of the various pieces of equipment in the fractionation unit are:

Utility	Volume
Cooling water, gal. per day	10,000,000
Steam, lb. per day	1,440,000
Refrigeration, tons per day	1,450

Facilities are so designed that 1 day's output can be loaded in an 8-hour period for rail shipment. However, trucks will load on a 24-hour basis each day. The 40-spot tank-car rack will have propane loading at all spots, isobutane at five, normal butane at eight, and natural gasoline at five.

The truck rack is designed for three-island loading. Six propane spots and three spots each for normal butane, isobutane, and natural gasoline are provided. Odorization equipment is provided at all spots on the tank-car and truck rack.

Maximum loading rates will be 900 g.p.m. for propane and 200 g.p.m. for each of the other products.

There are separate facilities for storage of propane, n-butane, isobutane, and natural gasoline. Propane will be stored in 35 horizontal tanks in addition to a huge underground cavern.

The following hydrocarbon storage will be available:

Commodity and storage—	Volume (gal.)
Propane, horizontal	1,800,000
Propane, underground	6,300,000
Isobutane, Hortonsphere	250,000
Normal butane, Hortonsphere	500,000
Natural gasoline, Hortonsphere	100,000
Natural gasoline, horizontal	45,000

Articles on Petrochemistry

1. Use of Olefins for Chemical Production, Robert S. Aries and William Capulsky, The Oil and Gas Journal, July 6, 1950. Figs. 2 and 3.

2. Ethylene Chemicals—The Next Decade, J. W. Hutcheson and W. E. Kuhn, Chemical Week, Sept. 29, 1951. Ethylene Demand in 1962 for Fig. 2. Est. on Different Uses.

3. Forecasts for Petroleum Chemicals, anonymous, Petroleum Processing, Sept. 1952. Fig. 4. Est. total for 1975 in Fig. 1. Other tables.

4. Progress in Petrochemicals, Max Neuhaus and Nolan B. Sommer, Petroleum Processing, May 1952. Fig. 1. Uses of Ethane Derived Products.

5. Bulletin of Commerce, U. S. Department of Commerce, Vol. 7, No. 8, April 15, 1953. Shortage of Polyethylene Stressed.

6. Petrochemical Ethylene Production, W. L. Nelsoa, The Oil and Gas Journal, June 23, 1949. Approximate U. S. Utilization of Petroleum Ethylene, 1931-1940.

7. At Least 550 Million Pounds of Polyethylene by End of 1956, Chemical Week, March 21, 1953, p. 17.

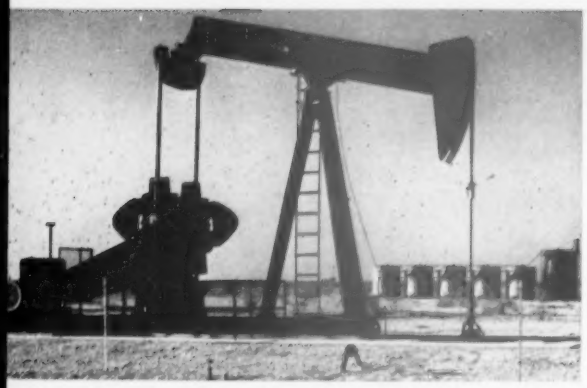
8. Chemical Week, July 19, 1952. Investment in Petrochemicals by Eight Large Firms.

9. Acetylene—Coming Petrochemical Building Block, Virgil B. Guthrie, Petroleum Processing, July 1952.

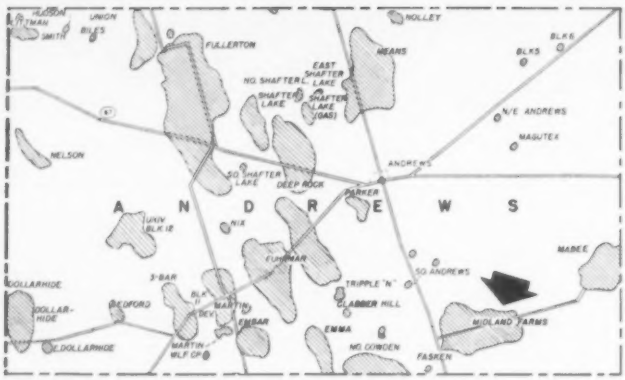
10. Aliphatic Building Blocks for Petrochemical Textiles, Peter W. Sherwood, Petroleum Processing, Nov. 1952.

11. Expansion Goals 99.7 Per Cent Filled. Anonymous, Petroleum Processing, Dec. 1952.

12. Petrochemicals in the Southwest, George Weber, The Oil and Gas Journal, 49, No. 52 (1951).



PUMPING UNIT designed for a 228,000-in.-lb. peak-torque load installed on a Stanolind lease in Midland Farms field.



PLACE-FIX MAP shows location of Midland Farms field in Andrews County, West Texas. (Map courtesy Midland Map Co., Midland.)

PERMIAN BASIN REPORT

Midland Farms, Texas, Reaches Major-Field Status

Grayburg limestone reservoir in Midland basin producing 22,000 bbl. of oil per day from 306 wells from 12,240 attributable acres

by Joseph A. Kornfeld
District Editor

MIDLAND FARMS oil field in Andrews County, West Texas, is the latest oil field in the Permian basin to reach status of a major producing area. Currently, this Grayburg limestone reservoir is producing more than 22,000 bbl. of oil per net producing day from 306 oil wells. More than 12,240 acres have been proven productive by these wells drilled on a spacing pattern of 40 acres per well.

Situated on the western side of the Midland basin, Midland Farms field was discovered on June 26, 1944, by Stanolind Oil & Gas Co. "F"-1 Midland Farms, SE NW Section 1, Block 42, Township 2n. The field produces from a depth of 4,800 ft. in the Grayburg dolomite of Permian age. Stanolind is the principal operator in the field.

Geologic structure is a terrace dipping southeastward at an average rate of 80 to 110 ft. per mile. However, on the east side of the field a series of small closures occur on this terrace; these closures range from 10 to 30 ft., as measured on top of the Grayburg.

Contractors who were active in development of Midland Farms field included Cactus Drilling Co., San Angelo, Tex.; Hissom Drilling Co., Midland and Odessa; Lee Drilling Co., Tulsa, and Noble Drilling Co., Tulsa.

All wells were drilled with rotary tools from surface to total depth.

Casing program . . . An 11-in. hole is cut to a depth of 225 ft. where the 8⅝-in. surface pipe is set; 150 sacks of cement are placed behind the pipe. The shoe is drilled out with a 7⅞-in. bit and this hole size is maintained until the top of the Grayburg pay is reached at about 4,660 ft. At this depth the oil string of 5½-in. pipe is set and cemented. Scratchers and centralizers are run on the bottom 200 ft. of the 5½-in. casing for completion (Fig. 2).

On those wells where it is doubtful that a commercial well will be obtained due to low structural position, the hole is reduced on top of the Grayburg pay to a diameter smaller than the inside diameter of the casing. The oil string is then set after the pay is penetrated and tested.

Mud program . . . The mud program is arranged into two parts. From surface to the oil-string casing point, a water or natural red-bed mud is used. This mud becomes salt-saturated through drilling in the Permian salt section.

From the oil-string casing point to total depth, crude oil is used to penetrate the Grayburg. After total depth is reached, a radioactivity survey is run from total depth to the surface.

Completion Practices

Drill cuttings are taken at 5-ft. intervals. Drilling time is measured at 1-ft. intervals from the top of the Grayburg to total depth.

A major factor influencing the penetration interval in the Grayburg is the position of the well in the field with reference to a variable oil-water contact, or datum. This datum varies from a subsea elevation of 1,700 ft. on the west side of the field to 1,800 ft. on the east side. Structural position also influences this condition.

Stanolind has employed the practice of diamond coring one well per section to obtain sufficient control of core data to evaluate lithology and

hydrocarbon distribution in the Grayburg reservoir.

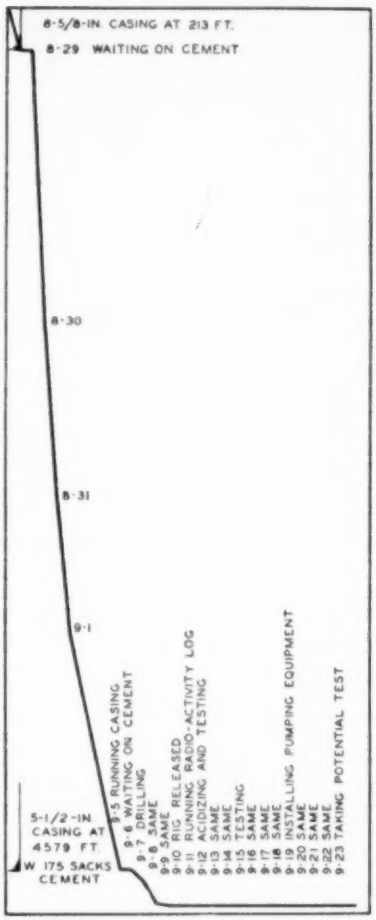
All cores are analyzed. Lithologic descriptions as well as the complete core analysis are prepared on large cores.

Well logging . . . Three types of well-logging surveys have been run in the field development of Midland Farms. Gamma-ray and neutron logs have been run on 95 per cent of all wells drilled. Broad application of the neutron curve has been made for calculation of porosity through use of a quantitative method of correlating porosity (as determined from core analysis) with the magnitude of the neutron curve (as measured in per cent of total neutron curve deflection).

Conventional electrical logs have been run on some wells primarily where diamond coring has been conducted in the Grayburg reservoir. Induction logs have been run in a number of instances to note the effect of shale contamination in the pay section, and to determine the location of water in the Grayburg.

Selective acidization of two principal pay intervals occurring throughout the Grayburg formation is conducted through the use of an acidizing tool with a side-door choke run on a wire line through tubing opposite pay zones. Identification of pay intervals in the Grayburg is determined first from various types of well-logging surveys as described elsewhere in this article.

The packer, with tubing perforations below, and a side-door choke with blankoff assemblies above, is run and set between the two principal pay zones to be acidized. The lower section is then acidized through the tubing perforations. The side-door choke blank is then pulled, and the tubing below the side-door choke blanked off, utilizing wire-line equipment. The upper formation is then acidized through the side-door choke.



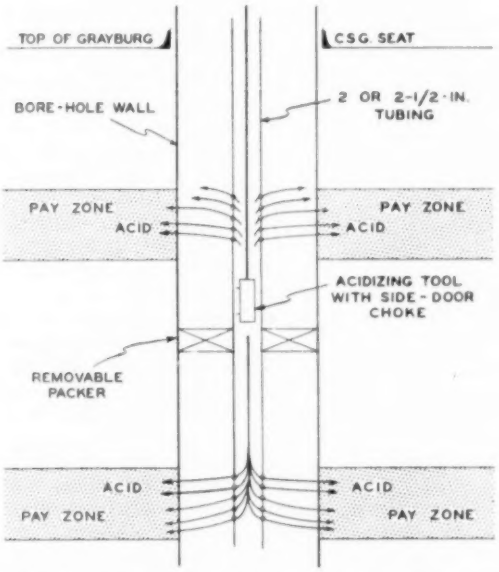
PENETRATION CURVE of a typical Midland Farms field well completed from Grayburg (Permian) pay topped at 4,646 ft.

Workover Practices

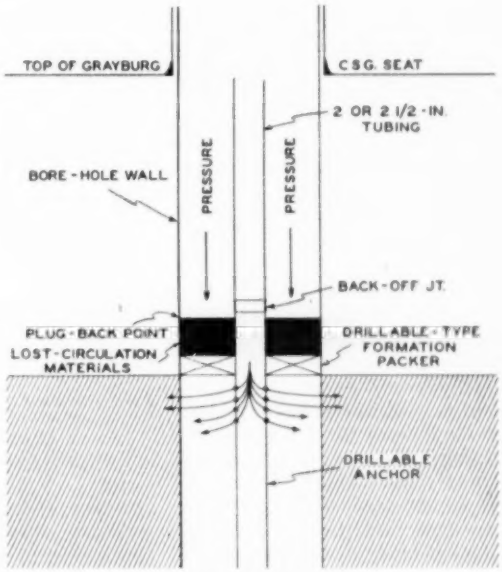
Several techniques have been employed to exclude entry of bottom-hole water. A Stanolind technique is the braden-head back-pressure method used in conjunction with a cement squeeze job conducted below a drillable formation packer which is left in the hole.

A drillable-type, preperforated anchor is run in the hole on 2 or 2½-in. tubing. It is set on a drillable-type formation packer opposite the plug-back point. Thus the anchor extends into the zone from which the water is to be excluded. After the formation packer is set, lost-circulation materials are spotted down the casing to seal around the packer and to seal the permeable formation above the packer.

The braden-head back-pressure application during squeeze cementing is conducted in this manner. Small-diameter pipe is run from the service truck to casing-head connections and the annulus is filled with mud; back pressure is built up to reduce the pressure differential occurring across the formation packer during the cement-squeeze operation. This prevents cement from bypassing the packer.



ACIDIZING TOOL with side-door choke used with packer for selective acidization is shown in above detail setting diagram.



BRADEN-HEAD SQUEEZE JOB shown in detail setting diagram above maintains pressure on annulus to prevent cement from bypassing packer.

Cement is introduced through the tubing in a conventional manner, entering the portion of the Grayburg formation from the plugoff point on down to total depth. After a sufficient volume of cement has been introduced into the lower part of the pay to insure an effective seal, the tubing is rotated generally with power tongs to back off a left-hand threaded safety joint at the top of the packer. After picking up the tubing a few feet, any cement and lost-circulation material above the packer is then circulated out. A bit is run generally on tubing to clean up the hole. On the normal job, drill pipe is never picked up and the formation packer is not drilled out. The packer is left in the hole and protects the top of the cement.

Plastic materials and cement are also used by application of the dump-bailer method to spot these materials for a water shutoff.

Reacidization has been conducted on a number of wells in this field. Some wells were treated with as much as 30,000 gal. in two stages.

Production Methods

All oil wells completed in Midland Farms are placed on artificial lift using beam-type pumping units. A number of these wells produce large volumes of fluid which require tapered sucker-rod strings and 1¼ to 2¼-in. tubing pumps.

Crude oil and produced gas are very sour. Hydrogen sulfide content of gas varies from 4,500 to 6,000 grains per 100 cu. ft.

Corrosion Control

Surface Equipment . . . During the early life of Midland Farms, produced-water percentages were low; hydrogen sulfide volumes produced were small and the resultant corrosive effect was limited. These conditions changed, however, and corrosion and scale formation became an acute problem. The life of steel emulsion treaters was short (from 2 to 4 years) and frequent scale removal was necessary.

To solve this problem Stanolind installed indirect heaters with cast-iron flow tubes used in conjunction with large-diameter, redwood settling tanks. Recently "redwood treaters" were installed. In the indirect heaters, periodic scale removal from the tubes was expensive despite the use of phosphate sequestering compounds.

Redwood treaters employ a steam generator from which steam is circulated through cast-iron or corrosion-resistant coils located in a small-diameter redwood treater. Performance data indicate that this practice has reduced corrosion and scale formation to such an extent that costs due to corrosion and scaling are relatively minor.

TABLE 1
Typical Formation Marker Summary—Midland Farms Oil Field, Andrews County, Texas
(Average surface elevation 3,070 ft.)

Formation—	Sample tops (ft.) Actual	Subsea
Rustler	1,850	(+1,220)
Yates	3,020	(+ 50)
Grayburg formation	4,490	(−1,420)
Grayburg pay	4,660	(−1,590)
Total depth	4,800	(−1,730)

TABLE 2
Reservoir Statistics — Grayburg Reservoir, Midland Farms Field, Andrews County, Texas

Top of pay, highest structural position, ft. subset	1,552
Oil-water contact, average ft. subsea	1,800
Maximum productive relief, ft.	248
Producing depth, average ft.	4,775
Spacing pattern, acres per well	40
Porosity range, per cent	0.9 to *29.8
Horizontal permeability range, md.	0.03 to *2,570
Horizontal permeability, average md.	48
Saturation pressure, original, psia.	632
Viscosity of reservoir oil at bubble-pt. pressure, cp.	2.5
Relative formation volume factor, bbl./bbl.	1.1276
Solution gas-oil ratio, original, standard cu. ft. per bbl.	221
Gravity of stock-tank oil, °A.P.I.	29-32
Maximum reservoir pressure, (datum —1,680 ft.), psig.	1,960

*Values measured from cores recovered from Stanolind Oil & Gas Co. "S"-8 Midland Farms.

TABLE 3
Midland Farms Oil Field, Andrews County, Texas

Method of exploration: Seismic

Date of first oil production: June 1944

Discovery oil well: Stanolind Oil & Gas Co. "F"-1, SE NW Sec. 1, Blk. 42, Twp. 2n

Well status: (March 1, 1953)
Number of pumping oil wells 306
Total number of wells 306
Deepest well drilled: Anderson-Prichard Oil Corp. 1-24 Fasken, Sec. 24, Blk. 42, Twp. 1n, TD 12,775 ft.

Productive acreage: (March 1, 1953)
Proved developed oil acreage 11,160

Productive zone: (Grayburg-San Andres at 4,800 ft.)
Maximum gross pay section, ft. 230
(logged in Stanolind Oil & Gas Co. "S"-8 Midland Farms)

Pipe-line outlet: Humble Pipe Line Co.

Field operators: Anderson-Prichard Oil Corp., Forest Oil Corp., David Fasken et al., Ralph Lowe, Magnolia Petroleum Co. and Stanolind Oil & Gas Co.

Subsurface equipment . . . As the field was developed, increased water production accelerated corrosion. Hydrogen sulfide corrosion effects were observed as pitting on tubing and rods and the formation of a black, iron sulfide scale. Rods failed due to hydrogen embrittlement as well as fatigue.

Premature failures of rods and equipment resulted from the combined effects of the corrosivity of produced fluids and the large volumes of produced water which created high stresses on sucker rods.

Inhibitor Applications

To mitigate corrosion, as many as 125 wells have been treated with either a **water-soluble** inhibitor such as formaldehyde[1] or an **oil-soluble** commercial inhibitor.

Formaldehyde . . . As an inhibitor of hydrogen sulfide, formaldehyde has proved highly effective at Midland Farms. Formaldehyde inhibits corrosion through the formation of a protective film on all subsurface equipment contacted by the formaldehyde or formaldehyde vapor. It is necessary to establish circulation of formaldehyde through the subsurface equipment so that the produced fluids will show a positive formaldehyde test 24 hours after each injection.

Formaldehyde treatment is conducted daily through the casing annulus. A water solution of 25 per cent formaldehyde is employed. After inhibitor is introduced, the well is flushed with a load of produced fluids to insure that the inhibitor solution will reach and mix with fluids throughout the annulus space. This action prevents formation of formaldehyde-sulfide polymers in the casing annulus.

Flushing action is conducted automatically through the installation of a storage tank and lubricator at the well head. Automatic timing and a shutoff valve obviate the need for special attention to this operation by the pumper.

Liquid organic inhibitor . . . A commercial liquid organic, oil-soluble inhibitor is also used at Midland Farms. Stanolind prefers using formaldehyde which has the extra advantage of being a volatile chemical and therefore helpful in protection of vapor space in the casing annulus.

Cathodic Protection

To mitigate external casing corrosion, Stanolind uses cathodic protection. Magnesium anode beds have been installed at 211 wells in Midland Farms field. Each bed comprises six 17-lb. magnesium anodes spaced 25 ft. apart in two parallel rows. Distance from the well head to the nearest anode is about 100 ft.

The value of this practice as a corrosion mitigant is indicated by casing potential surveys conducted **before** and **after** installation of anode beds. Flowline insulators are checked frequently to insure that they are functioning properly. However, the life of each installation is estimated at from 6 to 8 years.

Fuel gas . . . From the field discovery in 1944 to 1950, sour gas produced with the crude provided the only engine-fuel source in Midland Farms field. This fuel was not suitable for powering engines since the hydrogen sulfide content was as much as 6,000 grains per 100 cu. ft. Excessively high operating costs resulted from the use of sour fuel gas for pumping engines. A supply of sweet gas was brought into the field in the latter part of 1951. This switchover reduced the engine-operating costs. Since that time, down time on pumping engines due to the fuel has been negligible.[2]

Salt-Water Disposal

In order to handle the large volumes of produced water at Midland Farms, Stanolind is installing an extensive salt-water-collection and injection system. Approximately 92,000 ft. of asbestos-cement pipe will be used in the gathering system.

Air will be excluded from the system to minimize corrosion and the formation of insoluble precipitates by maintaining at least 2 oz. of gas pressure on all vessels in the system.

Water will be disposed of through two abandoned Grayburg dolomite oil wells. These wells are Stanolind's T-3 Midland Farms, located on the southwest side of the reservoir, and Q-4 David Fasken, on the northeast side of the field. Salt water will be returned to the lower part of the Grayburg.

Dual all-bronze fluid and reciprocating-pump units will be installed at each injection well so that if one pump is temporarily shut down the other pump can handle most of the production by operating at a higher speed. The system is arranged so that if one injection well is shut down temporarily, its disposal water can be pumped to the other injection well through a gathering-system trunk line by means of a portable centrifugal pump unit.

Pilot Gas-Injection Project

A pilot gas-injection project is being undertaken on an experimental basis to determine the susceptibility of the reservoir to secondary recovery methods. The field is under volumetric control, although large quantities of water are being produced.

The pilot project consists of six gas-injection wells arranged in a double five-spot pattern with two producing wells in the center. Currently, gas is being injected at a rate of approximately 600 M.c.f. per day. However, operation of the pilot project is flexible and injection volumes may be adjusted in accordance with observed behavior under gas injection.

Periodic gas-oil ratio and bottom-hole pressure tests are being taken in order that performance of the project can be evaluated.

Ellenburger Reservoirs

Two reservoirs have been discovered in recent months beneath the Grayburg dolomite production at Midland Farms. The deep zones lie in the Ellenburger dolomite about 8,000 ft. below the top of the Grayburg formation.

Midland Farms-Ellenburger . . . The first Ellenburger discovery in the area was completed on September 26, 1952, at Anderson-Prichard Oil Corp. 1 David Fasken "24," located 500 ft. from the north and east lines of the SE¼ of Section 24, Block 41, Township 1n, G&MMB&A Survey.

Initial production was 675 bbl. of 49.8°-gravity oil produced naturally through a 24/64-in. choke on 2⅜-in. tubing; initial produced gas-oil ratio was 560 cu. ft. per barrel. Production was obtained through casing perforations from 12,672-12,702 ft. A shot density of four bullets per foot of pay was employed. Plug-back depth was 12,790 ft. The discovery is a twin location to same interests' 2 David Fasken "24," a Grayburg oil well.

The following bore-hole-size casing, and cementing program was followed:

Bore-hole diameter (in.)	Casing diameter (in.)	Casing seat (ft.)	Sacks of cement
17½	13⅜	251	250
11	9⅝	4,943	466
7⅞	5½	12,792	200

Fourteen drill-stem tests were conducted at various levels ranging from 5,000 ft. in the Grayburg (Permian) dolomite down to the Ellenburger.

Deep formation markers encountered were the Mississippian at 10,600 ft.; the Woodford (Devonian) chert at 10,920 ft.; the Fusselman (Silurian) at 11,950 ft.; the Montoya (Ordovician) at 12,000 ft.; the Joins (Ordovician) at 12,620 ft.; and the Ellenburger dolomite at 12,667 ft.

Anderson-Prichard holds 2,560 acres of leases around the well. In addition, this firm has a one-half interest with Stanolind on 23,000 acres in the Midland Farms area.

Midland Farms Northeast - Ellenburger . . . A second Ellenburger discovery for the Midland Farms area was completed 6.3 miles northeast of the Midland Farms-Ellenburger discovery described in the previous paragraphs.

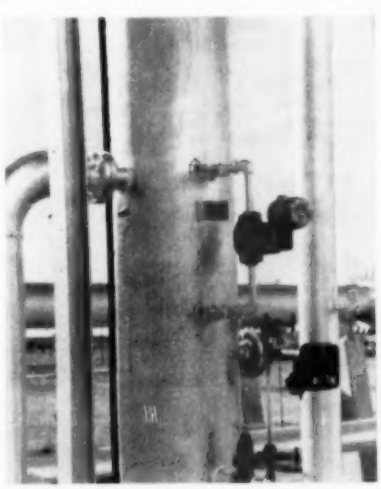
The discovery well is Shell Oil Co. 1-A-1 Andrews, C SE NW Section 16, Block 1, University Lands Survey, which flowed on potential 470 bbl. of 51.5°-gravity oil from 12,540-60 ft. and from 12,571-87 ft. in the Ellenburger dolomite (*A drilling article on this discovery appeared in The Oil and Gas Journal, February 16, 1953, page 177.*) The Railroad Commission of Texas granted a discovery allowable to this well on February 10, 1953.

References

1. Patented by Stanolind Oil & Gas Co.
2. Clements, Frank H., and Jack P. Barrett, "Drastic Cuts in Corrosion Costs in Sour-Crude Field, World Oil, Vol. 135, No. 5 (October 1952), p. 264.

What Is This Equipment?

THE equipment pictured below is found in a West Texas gas-lift plant. While it is more commonly used in refining applications, this photograph emphasizes the fact that petroleum processing begins at the well head.



Can you identify it? Check the answer in one of the squares below, then turn to page 93 to check yourself.

- ☐ Liquid-level controller on a scrubber in the plant.
- ☐ Differential pressure controller on an oil-gas separator.
- ☐ Remote-control shutdown device on the gas supply.
- ☐ Flow controller on the inlet gas to the plant.

UNITED STATES REFINERIES

Company and refinery location—	Capacity (bbl./day)	Solvent extraction	Solvent dewaxing	Propane deasphalting	Finished lube capacity	Lube processes
Atlantic Refining Co., Philadelphia	123,500	5,600	3,500	3,500	5,000	Nitrobenzene, phenol, MEK-benzol, propane, acid and clay
Bayou State Oil Corp., Hosston, La.	1,000				500	High vacuum distillation and acid and clay
Berry Asphalt Co., Waterloo, Ark.	1,500				350	Spec. vacuum distillation
Calumet Refining Co.:						
Burnham, Ill.	1,200				750	High vacuum distillation
Princeton, La.	900				750	High vacuum distillation
Champlin Refining Co.,† Enid, Okla.	20,000	2,850			1,800	Duo-Sol, phenol
Cit-Con Corp., Lake Charles, La.		17,500	8,500		6,000	Duo-Sol, furfural, MEK-benzol
Cities Service, Ponca City, Okla.	20,000				*1,050	Acid and clay
Continental Oil Co., Ponca City, Okla.	52,500	4,300	2,775		2,100	Duo-Sol, furfural, MEK-hexane, benzol, barisol
Cooperative Refining Assn., Coffeyville, Kans.	25,000	2,000	2,000		1,500	Furfural, MEK-benzol, vac. dist., acid and clay
Henry H. Cross Co., Smackover, Ark.	6,000				1,000	Vac. dist., acid and clay
Crown Central Petroleum Corp., Houston	4,000				1,000	Conventional
Deep Rock Oil Corp., Cushing, Okla.	19,000	(§)			865	Conventional
Elk Refining Co., Falling Rock, W. Va.	4,500				1,000	Conventional
Esso Standard Oil Co.:						
Bayonne, N. J.	32,000		6,300		5,000	MEK-acid and clay
Baton Rouge, La.	259,000	12,000	8,500	4,000	8,600	Phenol, MEK-benzol, propane dewaxing and deasphalting, acid and clay
Golden Bear Oil Co., Bakersfield, Calif.	3,000	600			1,100	Furfural
Gulf Oil Corp.:						
Philadelphia	107,000	3,000	¶1,200		1,100	Duo-Sol
Port Arthur, Tex.	245,000	11,000	3,400	4,000	12,000	Furfural, phenol, MEK-benzol, propane, alchlor, Sharples dewaxing
			¶2,700	2,600		
Humble Oil & Refining Co., Baytown, Tex.	260,000	9,000	9,500	6,700	12,400	Propane, phenol, MEK-benzol, acid and clay treating
Kendall Refining Co., Bradford, Pa.	4,800	1,000	1,200	1,200	1,200	Phenol, propane, pressing
Lion Oil Co., El Dorado, Ark.	22,000				1,000	Vac. dist. (spec.)
Macmillan Petroleum Corp.:						
Norphlet, Ark.	4,500				1,395	Vac. dist. (spec.)
Long Beach, Calif.	7,500				350	Acid and clay
Magnolia Petroleum Co., Beaumont, Tex.	170,000	11,000	9,000		6,000	MEK-benzol, Duo-Sol, furfural
Mid-Continent Petroleum Corp., Tulsa	65,000	6,000	6,000	4,500	7,000	Chlorex, propane
National Refining Co., Findlay, Ohio	13,000				600	Acid and clay
Palomar Refining Co., Bakersfield, Calif.	1,300				Not stated	Vac. dist.
Pennsylvania Refining Co., Karns City, Pa.	1,500				300	Conventional
Pennzoil Co., Oil City, Pa.	8,500	1,000	2,250		2,250	Chlorex, MEK-benzol, propane
Phillips Petroleum Co., Kansas City, Kans.	55,000	3,000	2,400	2,000	2,000	Phenol, propane
Premier Oil Refining Co.,‡ Fort Worth, Tex.	8,000				700	Conventional
Pure Oil Co.:						
Cabin Creek, W. Va.	5,500				450	Conventional
Nederland, Tex.	58,200				2,000	Phenol, MEK, propane
Quaker State Oil Refining:						
Emlenton, Pa.	2,000	1,680	2,000		1,700	Furfural, MEK-benzol
Farmers Valley, Pa.	4,000	1,680	2,700		2,295	Furfural, MEK-benzol
Oil City, Pa.	2,800				600	Conventional
St. Marys, W. Va.	2,500	680			600	Furfural

U. S. Lube Capacity Shows Little Change

Total of 63 plants now have operating capacity of 178,487 bbl. per day, survey reveals

THE nation's capacity for producing lubricating oil stands at 180,687 bbl. per day, according to a survey compiled by the National Petroleum Association. Due to the current excess of productive capacity over domestic and export demand, the 1953 survey of lube-oil plants shows little new capacity as compared with last year.

Excluding 2,200 bbl. per day in two plants which are not now operating, the operating capacity totals 178,487 bbl. per day, from 63 refineries. Of this total, 39 plants, representing 161,652 bbl. per day, or 89 per cent of total capacity, maintain some form of solvent extraction, solvent dewaxing, or propane dewaxing. The remaining 26 refineries, with 19,035 bbl. per day in total finished lube capacity, are classed as "conventional," employing vacuum distillation, and acid and clay.

Since yearly comparisons have recently become inconclusive due to the static situation in lube-capacity installation, the 1953 survey is better contrasted with the nation's lube capacity in April of 1949. At that time, total productive capacity stood at 176,747 bbl. per day, representing 70 refineries. Four years ago, 38 refineries totaling 153,308 bbl. per day or nearly 87 per cent of total capacity, employed one or more forms of solvent refining. The number of conventional plants has declined from 32 in 1949 to 26 in 1953, and capacity has dropped from 23,439 to 19,035 bbl. per day.

Solvent-extraction capacity has risen from 153,308 bbl. per day in 1949 to 161,652 bbl. per day this year. Solvent dewaxing has also increased, from

PRODUCING LUBRICATING OILS

Company and refinery location—	Capacity (bbl./day)	Solvent extraction	Solvent dewaxing	Propane deasphalting	Finished lube capacity	Lube processes
Shell Oil Co.:						
Houston	125,000	5,400	3,700	3,800	3,000	Phenol, propane, MEK-benzol, clay filtration
Martinez, Calif.	55,000	4,880			3,100	Sulfur dioxide, furfural, acid and clay filtration
Wood River, Ill.	135,000	3,000	3,600	3,300	3,100	Duo-Sol, propane, acid and clay filtration
Sinclair Refining Co.:						
East Chicago, Ind.	110,000	5,100	4,750	4,250	2,750	Propane, phenol, MEK
Houston	90,000	3,500	4,000	4,000	3,233	Propane, phenol, MEK
Wellsville, N. Y.	9,000	1,500	3,500		2,250	Nitrobenzene, acid, MEK, contact treating
L. Sonneborn Sons, Inc.:						
Franklin, Pa.	1,650				500	Conventional
Petrolia, Pa.	*4,000				1,000	Conventional
Socony-Vacuum Oil Co., Inc.:						
Olean, N. Y.	6,500	1,300	1,200		1,200	Chlorex, MEK-benzol
Buffalo	24,000				1,000	
Paulsboro, N. J.	72,500	11,000	6,100	8,500	7,500	MEK-benzol, Duo-Sol, furfural
Standard Oil Co. of California, Richmond, Calif.	138,000	16,500	5,800		9,000	MEK-benzol, RPM solvent, phenol
Standard Oil Co. (Ind.):						
Casper, Wyo.	18,100	600			570	Chlorex
Whiting, Ind.	205,100	3,220	2,950	1,200	5,670	Phenol, propane
Wood River, Ill.	48,100	1,400	2,320		1,024	Chlorex, propane
Standard Oil Co. (Ohio):						
Cleveland	45,000				1,200	Conventional
Lima, Ohio	39,000				1,500	MEK-furfural, PDA
Sun Oil Co., Marcus Hook, Pa.	145,000	8,000	5,000		11,800	MEK-benzol, vac. dist., Duo-Sol, furfural
The Texas Co.:						
Lawrenceville, Ill.	47,000	2,000	*1,400		*1,150	Furfural, acetone-benzol
Port Arthur, Tex.	210,000	18,000	11,000	4,000	16,000	Furfural, sulfur dioxide, MEK-benzol, propane
Three Rivers Refinery, Three Rivers, Tex.	1,500				750	Vac. dist., acid and clay
Tide Water Associated Oil Co.:						
Avon, Calif.	85,000	1,660			1,660	Sulfur dioxide
Bayonne, N. J.	83,000	7,000	3,500	3,400	2,400	Furfural, MEK-benzol, propane
Union Oil Co. of California, Oleum, Calif.	82,800	10,450	3,500		3,100	Duo-Sol, phenol, propane, propane dewaxing and clay
United Refining Co., Warren, Pa.	5,500				1,400	Adsorption extraction, conventional
Utah Oil Refining Co., Salt Lake City	27,000				120	Conventional
Valvoline Oil Co., Division of Ashland Oil & Refining, Freedom, Pa.	4,000				800	Conventional
Wolf's Head Oil Refining Co., Reno, Pa.	2,500				650	Conventional

*Lube unit not operating at present time. †Phenol extraction for light neutrals—Duo-Sol extraction for heavy lubricating oil. ‡Running 5,000 bbl. per day of crude—lube plant not operating. §Phenol extraction and propane deasphalting plant under construction—about 1,000 bbl. per day finished H.V.I. capacity. This will replace the conventional plant. ¶Sharples dewaxing. ‖Alchlor refining.

119,808 to 136,245 bbl. per day, and propane dewaxing capacity has risen from 60,000 to 60,950 bbl. per day.

The estimates of required capacity for lubricating oils in this country is currently being debated. PAD has asked the industry to install 28,000 bbl. per day more in capacity by 1955, stating that the defense program requires that much additional capacity. Some industry spokesmen take issue with this. NPA president A. W. Scott, of Wolf's Head Oil Refining Co., Inc., recently pointed out that, assuming that 12,000 bbl. per day in existing capacity may be retired by 1955, this PAD program would result in the net increase to 194,000 bbl. per day by that date.

Estimates of total demand from domestic manufacturers indicate a static level of about 153,000 bbl. per day with a nominal increase in United States consumption offsetting the expected continuous decline in export demands. This would result in an excess of capacity over demand of roughly 41,000 bbl. per day in 1953, which is greater than the relative figures for proposed excess capacity for other petroleum products.

Answer to Check Chart

The puzzle picture appearing on page 91 of this issue is correctly identified as liquid-level controller on the second-stage scrubber in the gas-lift plant.

BOOKS

GEOLOGY OF THE CABALLO MOUNTAINS. By Vincent C. Kelley and Caswell Silver. University of New Mexico Publications in Geology. Published by University of New Mexico Press, Albuquerque, N. M. 286 pp. $5.

This is the fourth in a series of studies intended to present materials from the whole field of geology with particular emphasis on those relating to the Southwest. This study treats particularly the regional stratigraphy and structure and mineral resources, including oil and gas. The authors conclude that possibilities for oil and gas exist in the basins adjoining the Caballo Mountains.

AN INTRODUCTION TO THE WILLISTON BASIN. Published by Petroleum Information, Continental Oil Building, Denver. 175 pp. $10.

This volume includes discussions of the geology of the basin, the problems of drilling, exploration, and marketing which will be incidental to the development of the area, a geophysical-activity review, and a general wide cross-section of information hitherto not available in collected form in a single volume. Each of the discovery wells in the basin is discussed individually, field maps are included, and an over-all activity map of the basin is also part of the book. Important wildcats, with tops and other pertinent data, are listed in the appendix, which also includes a discussion of some of the characteristic cities in the basin.

Sun Pipe Line's Products System

(Continued from page 77)

Beaumont and Longview, Tex., a 20 and 26-in. line; and in the Mesa Pipe Line System, which is a 24-in.-diameter carrier running from Midland to Colorado City, Tex., at which point it connects with West Texas Gulf.

Sun Oil Co. owns an interest in Detroit Southern Pipe Line Co. along with Gulf Refining Co. and Pure Oil Co. This is a products carrier extending from Toledo to Hamtramck, a suburb of Detroit.

During 1953, Sun Pipe Line Co. plans to lay a products line from Sarnia to Toronto.

Diverse traffic . . . The products pipeline transportation business of Sun Pipe Line Co. has numerous ramifications, including exchanges with other pipe-line companies.

In the regular course of business there is an interchange of shipments with Atlantic Refining Co.'s Keystone Pipe Line system. Normally deliveries are made three times a month by Atlantic through its Keystone system to Sun Pipe Line Co.'s product system at Allegheny Junction, near Pittsburgh on the west line. These shipments are moved westward through Sun's line to Atlantic terminals near Youngstown, Akron, and Cleveland. The westward movement of these Atlantic shipments causes the displacement of Sun products westward into various tankage. Upon the completion of Atlantic shipments, normal flow of Sun products is resumed in an eastward direction to the Pittsburgh area.

In New York State, Keystone handles shipments for Sun Oil for delivery at Rochester and Buffalo. Keystone Pipe Line Co. has connections with the Sun system at double junctions on the north line known as Berne and Elverson.

Marketing department receives . . . In discussing the general plan of the Sun system's operations, it should be noted that deliveries from the line are made into tanks of Sun Oil Co. and others. This means that Sun Pipe Line Co. is concerned only with transportation and not with storage and transshipment to trucks and barges.

Operational complications . . . Prior to to completion of the tie-in link in Ohio, operations were a relatively simple matter, generally speaking, as each line had a definite directional flow.

The north line from Icedale to Syracuse, moves gasoline, kerosine, and burning oils for Atlantic, Gulf, Sun, and others. The flow in this section remains in a northerly direction. Gasoline comprises roughly 82 per cent of the throughput and other products 18 per cent.

The east line from Twin Oaks to Newark has a daily capacity of 40,000 bbl. Gasoline comprises 73 per cent and other products 27 per cent of the east-line throughput.

The west line, which prior to completion of the tie-in link normally flowed only in a westerly direction, has, since completion of the Fostoria-Hudson link, become extremely complicated in operations. The section of west line between Icedale and Allegheny in the Pittsburgh area continues to handle only Sunoco gasoline in a westward movement. There is no batching in this line since the whole section is a huge 244-mile container through which one brand of gasoline is being steadily pumped by automatic stations to provide for withdrawals at terminals along the line. Capacity of this section is 16,000 bbl. daily.

The section of line between Toledo and Hudson has an eastward flow with the stream being split in two directions at Hudson for Cleveland and the Pittsburgh area. Intermediate deliveries between Hudson and the latter area are taken at Akron, Youngstown, and Vanport. The flow in the Allegheny-Cleveland section is reversed, however, when taking Atlantic shipments from Keystone at Allegheny for westward movement to Youngstown, Akron, and Cleveland.

The west line delivers to Vanport, Pa., on the Ohio River, from whence barge shipments are made to Brownsville, Pa.; Wheeling and Conover, W. Va.; Marietta, Ohio, and occassionally as far as Cincinnati.

Batching . . . The policy of Sun Pipe Line Co. is to batch shipments which are definitely identified with the owners which ship them. Shipments for other companies are scheduled several weeks in advance and Sun's own products are scheduled on a weekly basis. Minimum tenders of 50,000 bbl. are specified in the tariffs but these can be split for convenience in handling. An effort is made to avoid batches of less than 25,000 bbl.

Products handled include two grades of gasoline, butane, propane, No. 1 and 2 burning oils, kerosine, and solvent spirits. Since commencing liquefied petroleum gas shipments in 1950, the butane has been going to Polymer Corp., of Sarnia, for the manufacture of synthetic rubber, and propane was shipped to Michigan Consolidated Gas Co., Detroit, for gas enrichment.

Dispatching of all lines except the Toledo-Sarnia line is handled at Sun's Philadelphia office. Communication is carried by telephone over Bell system and teletype over leased A. T. & T. circuits. Daily pumping orders are transmitted via teletype to all stations covering the following day's operations. These lines of communication are supplemented by mobile telephones in the cars of superintendents, foremen, and other maintenance personnel.

Shipments through the Toledo-Sarnia line are scheduled and dispatched by the station foreman in charge of the Toledo station.

Stations . . . All 23 pump stations are equipped with electrically driven centrifugal pump units. At present there are 17 of these stations in regular operation of which 7 are operated automatically.

The automatic operation which is controlled by pressures, flow rates, temperatures, and electrical loads was initiated in 1933. Steps are being taken now to change to electronics which would provide for simpler remote control.

Hourly readings at manual stations are taken of pressure, temperature, flow rate, and amperes. Specific gravity of the stream being pumped through a station is measured by a Pycnorator. Automatic controls actuated by rate of flow in the pipe line start and stop pumping units. The original automatic stations were provided with devices to protect against dangers of hot bearings, hot stuffing boxes, excessively high or low pumping rates, high sump-tank level, high differential pressure across strainers, and overloading of motors in cases where the pneumatic control system failed.

Motors are base ventilated and pump rooms are ventilated by forced flow. Stations are safeguarded against vapor hazards by automatic explosive-gas detectors which were first installed in 1936. This is believed to be the earliest installation of these detectors on any pipe line. An alarm sounds when vapor in the station is at 10 per cent of the lower explosive limit and the station automatically shuts down when vapor is at 30 per cent of the explosive limit.

The new control program being planned by pipe-line engineers will continue some of the earlier controls with improvements. Electric controls will supplant pneumatic controls. For new stations, a completely different control system has been devised.

Metering . . . Metering of deliveries from the Sun Pipe Line to bulk plants commenced in 1933 after 2 years of tests. This was a pioneering undertaking which preceded by several years the wider acceptance of meters in products pipe lining in the late 1930's. The economy of metering was convincingly demonstrated and by 1942 all products received and delivered were billed on the basis of metering.

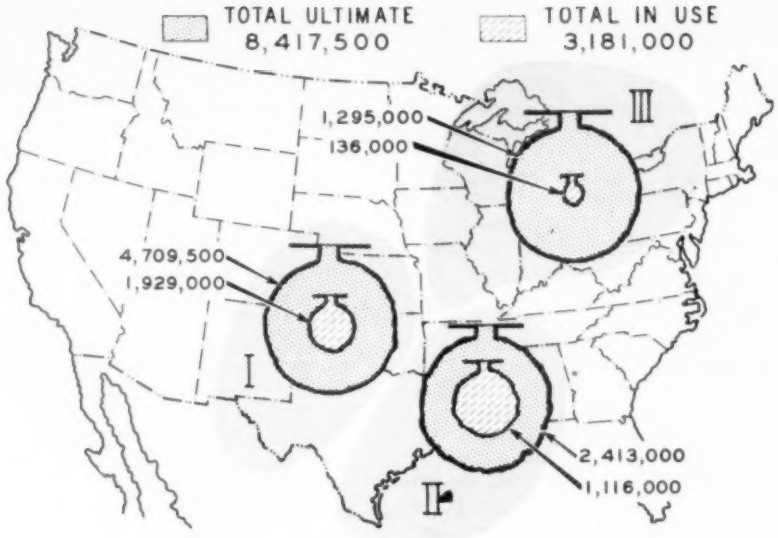


Fig. 1—Status of underground-storage cavities for L.P.G. early this year. Figures given are in barrels.

UNDERGROUND STORAGE

. . . Today—3,000,000 Barrels

. . . 1954-55—8,500,000 Barrels

. . . 1963 ?

by H. R. Thomas*

THE underground storage of liquefied petroleum gas has developed rapidly during the past 2 or 3 years. Up until the recent past the volumes of L.P.G. marketed to domestic-commercial, industrial, utility, and miscellaneous users were small compared with marketed volumes of other petroleum products. In recent years as the winter space-heating load and other uses have increased, the need for additional storage in all phases of the industry has become of vital importance.

Since World War II, L.P.G. has become a major industry and is reported second only to television in rate of growth. This recent development has made necessary larger volume storage. Underground cavities offer more economical means of large-volume storage than steel pressure tanks, and are filling the need for increased storage in this rapidly growing industry.

*L.P.G. sales superintendent, Stanolind Oil & Gas Co., Tulsa. Presented at Natural Gasoline Association of America annual meeting, Houston, April 30, 1953.

Estimates of cavity storage in use or planned are as follows:

	Bbl. in use or planned
1950	225,000
1951	840,000
1952	*2,000,000
1953	6,000,000
1954	8,500,000

*Revised.

The map shown in Fig. 1 indicates the status of underground storage cavities for L.P.G. in early 1953. The ultimate capacity in 1954, including projects under way now and those which will be completed in late 1953 and early 1954, totals approximately 8,500,000 bbl.

Storage areas . . . However, 96 per cent of present capacity is located in the producing areas of Texas, Louisiana, Mississippi, Oklahoma, and Kansas. This storage is needed in the producing areas, and it is anticipated additional storage will be added in these areas. Only 4 per cent of the underground storage is located in marketing areas outside the producing territory. Additional underground-storage cavities are needed in market areas to better balance production and transportation of L.P.G., and to assure continuous, reliable supplies for major markets.

The industry's storage problems cannot be solved at any one or two points. They must be solved by providing adequate storage at each point along the distribution systems. First, the producing plant or refinery must have adequate storage. Second, pipe-line, tank-car, and tanker terminals, where economically justified, must provide an adequate share of the storage. Third, the dealer or distributor bulk plant should provide a minimum of 2 weeks' storage based on peak demand.

In some cases two or three times this storage capacity is necessary. Last, and a very important point, is adequate storage at the ultimate consumer. A minimum of one-half of consumer year-round fuel requirements should be stored in advance for space heating at the point of consumption.

A larger volume of underground storage in the market area will assist in balancing year-round use of tank-car fleets to reduce car costs. In addition, L.P.G. stored close to markets assures the consumer of adequate supplies and accelerates market development.

Storage comparison . . . A review of a hypothetical plant without underground storage compared with the same plant utilizing underground storage will serve to illustrate the advantages of low-cost storage in moving maximum quantities of L.P.G. and operating tank-car fleets at maximum efficiency in supplying seasonal markets. There are many complications and ramifications in production, transportation, and sales of L.P.G. However, in order to simplify the case discussed, Table 1 shows the basis used for a theoretical plant.

The propane production moving from this plant on a 1½ to 1 ratio into local and tank-car markets without benefit of large volume storage results in 4 million gallons summer excess. Two million gallons excess results in each market. This material has a gross value at approximately 4 cents per gallon of $160,000. This is normally flared or injected into the residue gas stream at no value or at low values of ¼ to ½ cent per gallon.

One-half of production or 12 million gallons annually is assumed to be available for the tank-car market. One a 1½ to 1 ratio, 6 million gallons is sold during the winter 6 months and 4 million during the summer 6 months, or a total annual volume of 10 million gallons. These volumes require approximately 67 tank cars to move maximum

winter commitments and only 44 cars to move summer sales, leaving 23 idle cars during the summer season. These 23 cars represent a gross cash outlay of approximately $17,000 in car rental at $125 per car per month.

Thus, the plant has $160,000 worth of propane and $17,000 in idle-car costs or $177,000 in reduced income each summer.

Marketable production . . . If the plant has an underground cavity for storing summer surplus material, all production can be made available for market; half to local and half to tank-car markets, but a larger tank-car fleet is required. It should be noted that it is not necessary to store all of the 4 million gallons previously lost since a larger total volume may be committed in winter markets, resulting in moving larger volumes on summer commitments. Thus, in a 1½ to 1 ratio market a cavity of 2.4 million gallons is required. Table 2 shows the basis for providing a plant cavity.

The plant with one cavity shows an improvement of approximately $160,000 increase in revenue from propane previously lost or injected into the residue-gas line at low values. The transportation fleet has been increased from 67 to 80 tank cars while idle summer tank cars are increased from 23 to 27. The idle summer car gross rental increases from $17,000 to $20,000.

Table 3 shows the 2,000,000 gal. per month of propane production handled with a 1,200,000-gal. storage project at the plant and a similar storage cavity in the tank-car market area. The tank-car fleet required is reduced to 67 when both plant and market area cavity material moves by truck. Summer idle cars are reduced to nine by utilizing cars for movement of summer excess into the market area storage cavity.

If 14 of the 23 idle cars out of the fleet of 67 are kept busy moving summer excess propane to a cavity located in a distant market area, the gross rental cost of the remaining 9 idle cars is reduced to $6,700, or a savings of $11,300 compared with providing no cavity storage.

On the basis of idle-car costs alone, cavity storage may not be justified in marketing territories. However, where present or potential L.P.G. markets economically justify large-volume storage, the savings in tank-car costs are an added incentive to install underground-cavity storage in market areas.

Storage advantages . . . Underground cavities or other economical large-volume storage have several definite advantages over shipments direct to bulk plants from producing areas. These include:

1. Assurance of continuous supply during critical peak demand periods.
2. Short hauls by truck and smaller tank-car fleet during peak demand periods more efficiently utilizes transportation facilities and reduces operating costs.
3. Balance loads for railroads, thus creating better relations.
4. Reduced steel requirements for storage in market areas, conserving steel during periods of shortages.
5. Evaporation losses are minimized and fire hazards reduced.
6. Makes possible more intensive development of present markets in immediate area and development of new uses and new markets.
7. Producing plants assured of year-round outlets for maximum production.

It should be emphasized that market-area large-volume storage, where economically justified, assists in reducing tank-car rental costs to a minimum. However, the tank-car savings are a minor factor compared with the advantages of intensive market development and assurance of steady outlets for total production.

Plant revenue . . . Table 4 summarizes the plant revenue position. Where underground storage is provided at the plant, revenue is increased $157,000 over providing no storage. Where both plant and market-area storage is provided plant revenue gains $170,300 over no storage. Where local conditions make plant underground storage impractical, an excellent gain in revenue is shown for moving production through market-area storage. The examples used in this discussion are for small cavities in order to simplify the arithmetic. One

TABLE 1—PLANT PRODUCING PROPANE

1. Production: 2,000,000 gal. per month.
2. Markets: 50 per cent local truck, 50 per cent distant tank car.
3. Market ratio: 1½ gal. in winter for 1 gal. in summer.
4. Actual gallons produced for market:
   (a) Local—tank truck, 12,000,000 gal. per year.
   (b) Distant—tank car, 12,000,000 gal. per year.
5. Tank cars (10,000-gal. capacity) average 1.5 trips per car per month or each car moves approximately 15,000 gal. per month.
6. Tank-car rental $125.00 per month.

TABLE 2—PLANT WITH ONE PROPANE CAVITY

1. Production: 2,000,000 gal. per month.
2. 1½ to 1 ratio markets: 50 per cent local truck, 50 per cent distant tank car.
3. Cavity storage: 2,400,000 gal.
4. Available for market on 1½ to 1 ratio:
   (a) Local—tank truck: 12,000,000 gal. per year.
      Winter 6 months: 7,200,000 gal. or 1,200,000 gal. per month.
      Summer 6 months: 4,800,000 gal. or 800,000 gal. per month.
   (b) Distant—tank car: 12,000,000 gal. per year.
      Winter 6 months: 7,200,000 gal. or 1,200,000 gal. per month at 15,000 gal. moved per tank car, requiring 80 cars.
      Summer 6 months: 4,800,000 gal., or 800,000 gal. per month at 15,000 gal. moved per tank car, requiring only 53 cars.
      Idle cars: 27 at $125.00 per month per car, or gross rental of $20,000.

TABLE 3—PLANT PRODUCING PROPANE WITH CAVITY AT PLANT AND CAVITY IN DISTANT MARKET AREA

1. Production: 2,000,000 gal. per month.
2. 1½ to 1 ratio markets: 50 per cent local truck, 50 per cent distant tank car.
3. Cavity storage:
   (a) 1,200,000 gal. at plant.
   (b) 1,200,000 gal. in distant market area.
4. Available for market on 1½ to 1 ratio:
   (a) Local—tank truck: 12,000,000 gal. annually.
      Winter 6 months: *7,200,000 gal. or 1,200,000 gal. per month.
      Summer 6 months: 4,800,000 gal. or 800,000 gal. per month.
   (b) Distant tank car: 12,000,000 gal. annually.
      Winter 6 months: 6,000,000 gal. or 1,000,000 gal. per month of plant production requiring 67 tank cars, plus 1,200,000 gal. from storage cavity in distant market area via tank truck.
      Summer 6 months: 4,800,000 gal. or 800,000 gal. per month, requiring only 44 tank cars.
      Fourteen of the 23 idle cars are utilized during the summer 6 months to move 200,000 gal. per month from plant to market area cavity storage, leaving only 9 idle summer cars. This reduces idle car gross cost to approximately $6,700 from $20,000 in the case where cavity storage is located only at the producing plant.

*Includes 1,200,000 gal. moved by truck into the local market during winter from plant storage cavity.

TABLE 4—PLANT REVENUE POSITION

	Case 1 (No storage) underground	Case 2 (Plant storage) underground	Case 3 (Plant and market storage) underground
Product value	$800,000	$960,000	$960,000
Idle tank-car costs	17,000	20,000	6,700
Net product value	$783,000	$940,000	$953,300
Increased revenue from cavities		$157,000	$170,300

large market storage project can serve several producing plants.

Supply is the most important phase of any business. Whenever L.P.G. supplies are interrupted, the consumer loses confidence in the commodity service being furnished and competitive fuels and services (such as electricity) can then step in and take the customer away from L.P.G. Storage in the market area is an important phase of assuring a continuous and reliable supply of L.P.G. The future expansion of underground storage in both market and producing areas will assist in developing and expanding L.P.G. markets. Increased incomes to L.P.G. producers resulting from storage of material not normally sold will encourage additional plant facilities to meet these expanding markets.

It is anticipated underground storage will be utilized for storing other petroleum products as experience is gained and costs are reduced. The examples used in this discussion cover propane storage, but many cavities are being used for butane at present and it is believed natural gasoline and other products will be stored in cavities in the future.

In addition to underground cavity storage at plants and in market areas interest is being shown in prestressed concrete pipe buried underground. If this type of storage shows sufficient savings in cost over steel pressure storage, and meets the necessary engineering and safety requirements, it, no doubt, will fill a need for storage in areas where salt and mined cavities are impractical.

How Sominco Solved Maintenance Problems at Richard King Field

by C. Malcolm Davis
Gulf Coast District Editor

MAINTENANCE problems at the Southern Minerals Corp. compressor plant in Richard King field have been largely overcome in the 4-year period during which the plant has been operating. A detergent-type engine oil is used with an oil filter in each engine. Filters are changed every 30 days. A bypass has been installed around each filter unit to enable changing filter without shutting down the unit.

Spark-plug trouble has been eliminated by changing types of plug. A set of plugs now last 12 months. Use of lithium-base grease has eliminated power-takeoff failure. There has been no failure in over 2½ years.

A systematic of preventive maintenance has been evolved, and the compressors have been housed in prefabricated, sectional steel buildings.

Gas flaring eliminated . . . Richard King field was discovered in November 1937, with oil production being obtained from several reservoirs at depths between 5,200 and 5,700 ft. Pressure maintenance has been conducted from August 1946 to the present time on the upper 5,400 ft. sand, a solution gas-drive reservoir. Gas flaring was discontinued in July 1949 when the portable compressor plant was put into operation. All gas from this sand and some other makeup gas has been injected daily into the reservoir.

The station has eight engine compressor units, four operating in first-stage, and four in second-stage. Suction pressure is 50 psi.; high-stage discharge is at 700 psi. The gas feeds into Southern Minerals' industrial fuel gas system of the Corpus Christi area.

Portable units . . . All compressors are V-belt driven by multicylinder gas engines rated at 213 hp. However, the engines are run at 1,300 r.p.m. because continuous service is required. The approximate A.P.I. specification at this reduced speed gives each engine a horsepower output of 117. Single-stage, horizontal compressors are skid-mounted with the engines. Operating at 275 r.p.m. the rated gas-handling capacity of each compressor is 1.6 million cubic feet.

Gathering of gas . . . The low-pressure gas has been gathered by about 4 miles of 2½ to 5-in. lines. These join into a 6-in. main line which increases to 10 in. at the station. A conventional field separator removes any entrained liquids. A volume chamber approximately 16-in. in diameter by 3 ft. long was installed at each of the four low-stage compressors. Full rated station capacity is realized on the suction side of the low-stage compressor with this piping arrangement.

Preventive maintenance . . . A program of preventive maintenance is carried out in all units with the following periodic checks and overhauls:

Daily—
- Check oil and water levels.
- Check pressure and flow charts.

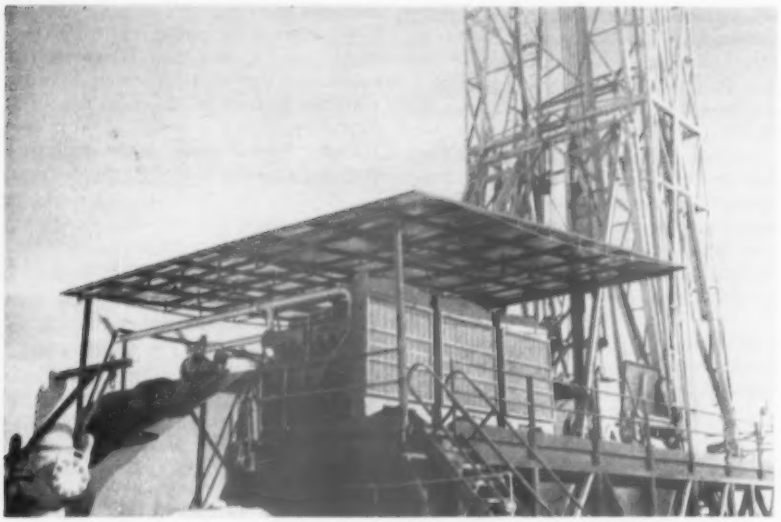
Quarterly—
- Overhaul magneto.
- Check power takeoff.
- Check automatic switches.

As needed—
- Stop all oil leaks.
- Paint complete station.

Lease gas is used as fuel for the engines and starting gas for turning over the compressors is taken from the 700-psi. main line through a pressure reducer.

Other aspects of the plant such as cooling of engine jacket water, makeup-water system, automatic shutdown devices, relief-valve system, and auxiliary equipment have functionel very well.

Station has eight engine compressor units, four operating in first stage and four in second stage.



ROOF OVER engines on rig of Clyde Hall at McKittrick, Calif., is made up of four sections, 6 ft. wide, connected at edges with bolts. Truss-type supports require only four posts to install roof on rig.

Steel roof for drilling rig made of four sections

CLYDE HALL, drilling contractor, of Bakersfield, Calif., has developed a solid and effective roof for drilling engines and draw works.

The roof is of all-metal construction, fabricated in four sections, each 6 ft. wide and long enough to cover that section of the drilling rig occupied by the three engines and the back part of the draw works. Each panel of this roof lays on a framework of channel iron, bound on the sides by angle iron, all welded into a single unit. The long sides are equipped with truss-type supports, permanently attached, which match adjoining sections perfectly, no matter which section is laid first.

Intermediate stringers, or rafters, are of channel iron, and cross members are alternately pieces of channel iron and truss-type supports. The roof covering is light-weight steel, similar to tank steel, and is attached by spot welding to the frame so that it will not separate under any climatic or wind conditions normally anticipated in the areas where the rigs are to be operated.

Vertical supports . . . Four vertical posts are set in retainers on the floor of the rig, two at the extreme outer corners away from the draw works, and two on opposite sides of the mast-type derrick's diagonal supporting legs back of the draw works. The retainers, or post sockets, are heavy pipe which are attached to the girders, or sills, of the substructure by welding so they will support the posts upright and carry the weight of the roof without noticeable movement.

The posts receive dowel pins, welded to the extreme ends of a heavy truss-type support, upon which the roof sections are placed when rigging up. The dowel pins at the ends of this truss are sized to slip snugly into the open ends of the vertical pipe supports so that added stiffness is provided by this method.

When the roof sections are laid flat upon the end-piece trusses, matching sides are brought together with machine bolts and the nuts run up tightly so that, when the structure is assembled, it is, in effect, a single roof section.

The roof is held down to the end truss supports by bolts placed in holes at the sections seams and passing through the top rail of the end supports.

UNDERSIDE DETAIL of cross-bar truss-shaped end piece with pins. These set into upright pipe supports.

"A" Frame Supports Used For Hydraulic Fittings

To prevent damage to threaded connections where the hydraulic nipples are attached to the discharge flange of mud pumps, and to take the shock produced by blowouts of the hydraulic hose, an "A" frame, made of pipe, is permanently attached to the mud-pump supporting sills.

The A frame is fitted with a half-saddle at the top, the exact size of the hydraulic nipple, completed with a matching clamp that is bolted in place.

ON THE JOB . . .

. . . IN THE FIELDS

The legs of the frame are supplied with pads conforming to the surface of the sills, and bolted securely in place.

The usual safety chain is attached to the hose with clamps, and looped around the hydraulic nipple at the point of contact with the supporting saddle. The support is permanent, and moves with the pumps when shipped from location to location.

Truck Has Clamp Base to Hold Welding Cylinders

The problem of supporting oxygen and acetylene cylinders has been solved for a drilling-rig-service welding truck.

A tread-stock floor on the truck frame supports the arc-welding unit, and supplies a working space for small jobs. At one corner of the floor, circular receivers are set which hold the cylinders solidly in position.

The floor was split and holes cut in the matching edges of the separation. Narrow rings attached to these holes were devised so the bottoms of

the cylinders would slip snugly into position. A second floor a few inches lower supports the weight of the cylinders when on the truck.

Two heavy bolts, with nuts permanently attached to the inner separation of the split floor, are used to draw the clamps tightly around the base of the cylinders so they cannot be removed, except by first removing the clamp bolts.

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Pictured below is an installation of 8 Wilson Supply-Ingersoll-Rand "Packaged" Portable Booster Compressors—handling some 6,000,000 Cu. ft. of gas per day in the Richard King Field in South Texas.

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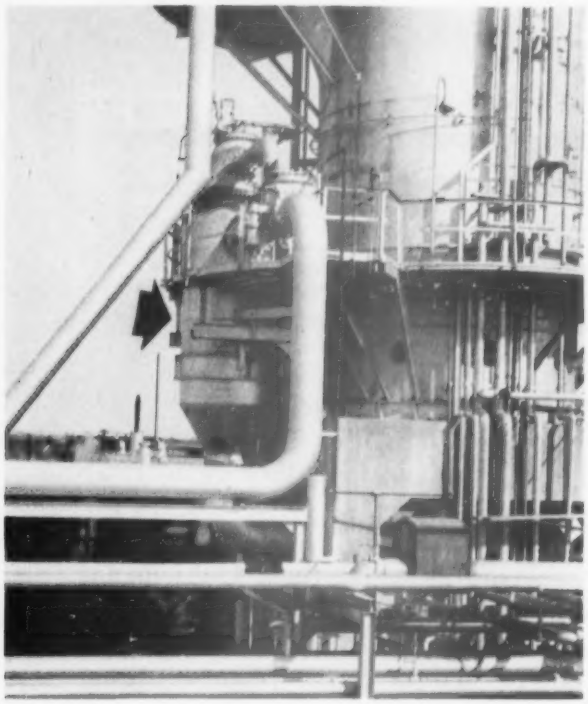
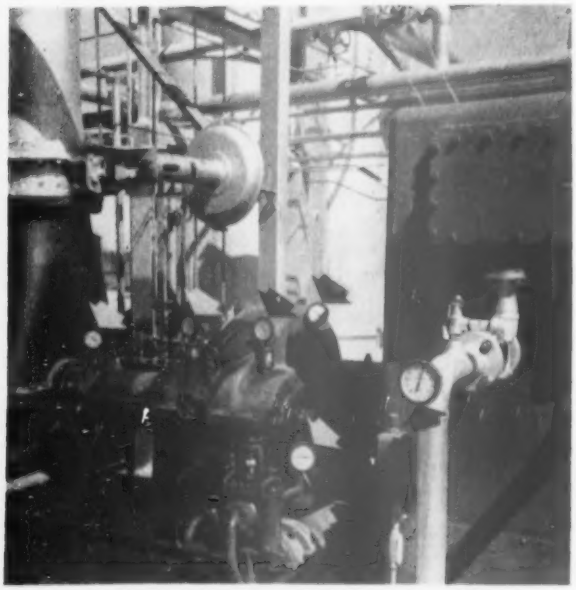


1 Waste-heat steam generator on cat cracker at El Dorado Refining Co. plant, El Dorado, Kans. Arrow indicates generator.

2 Direct-fired air heaters at Vickers Petroleum Co.'s refinery at Potwin, Kans. Arrow points to heater.

Many important units go into . . .



5 F.C.C. air blower at El Dorado's plant. Speed increaser is between motor and blower. Arrows indicate points for checking temperature during operation.

A TRIP through any modern refinery will impress the visitor who is not acquainted with the workings of an intricate petroleum-processing plant. He will soon see that hundreds of highly complicated units go into making up the even more complicated plant itself.

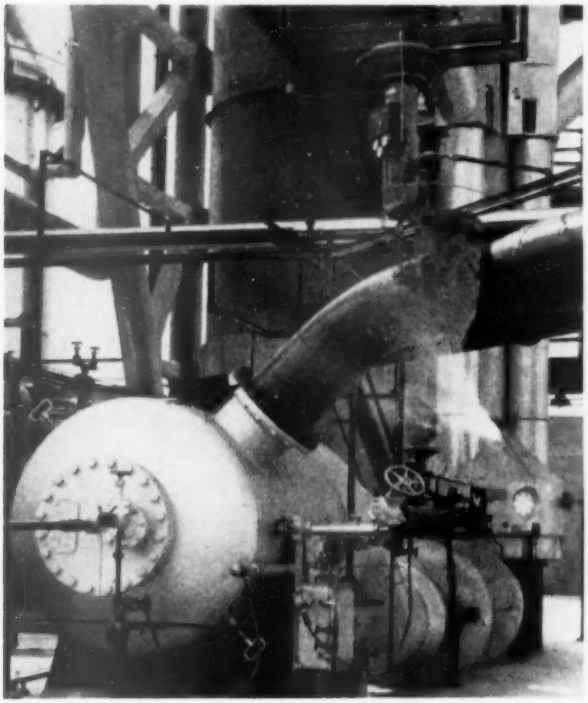
Petroleum processing has evolved into a highly technical and exacting science over the years. No longer, in many cases, is it adequate for a refinery to make one or two products; literally scores are manufactured within the overall refinery site to meet competition and provide products for the market.

These six views taken at two different refineries show a little of the complexities which are incorporated into unitized refinery operation.

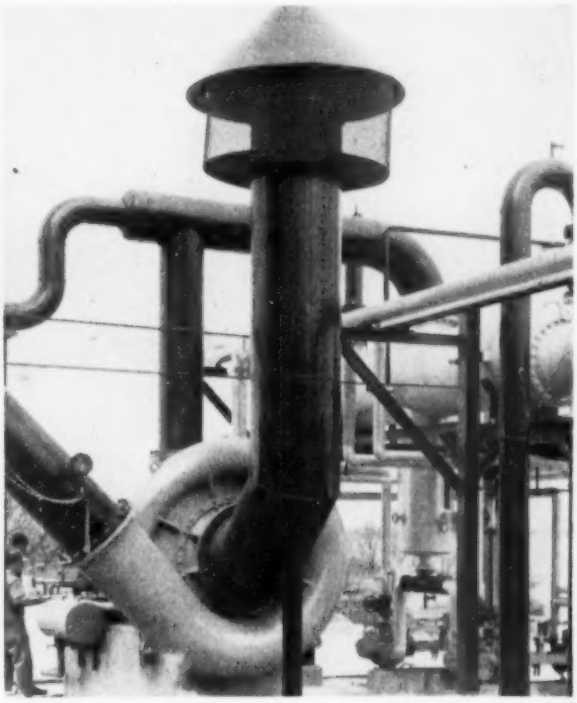
About the Pictures

. . . **1**—This waste-heat generator on an F.C.C. cat cracker at El Dorado Refining Co.'s plant in El Dorado, Kans., picks up heat from regeneration catalyst. The catalytic cracking unit has a daily crude-oil-charge capacity of 5,000 bbl.

. . . **2**—The direct-fired air heater at Vickers Petroleum Co.'s Potwin, Kans., refinery, manufactured by John Zink Burner Co., Tulsa, is a combination air heater used to bring



3 Horizontal or lift heater operates continuously moving catalyst at Vickers' plant. Arrow indicates heater.



4 Cage on air intake to blower on new T.C.C. unit at Vickers' Potwin, Kans.

. . . making of a modern refinery

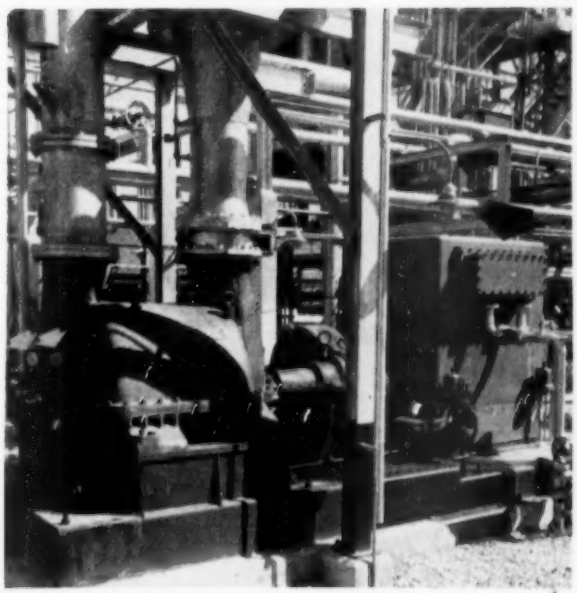
the entire system up to temperature before oil feed is started; it is used only on startup.

. . . **3**—This horizontal heater is the "lift" heater on Vickers' cat cracker. It operates continuously, moving catalyst from the lower to higher portion of the cracking unit. Heat duty is over 12,000,000 B.t.u. per hour. Both the horizontal and vertical heater operate on a limited amount of fuel. Following combustion, fresh air is mixed with combustion gases so that effluent temperature is about 1,000° F. Both units are equipped with automatic flame-failure safety controls.

. . . **4**—The cage on the air intake to the blower on the Vickers T.C.C. unit at Potwin prevents foreign objects from getting into the blower.

. . . **5**—Speed increaser is installed between the motor and air blower at El Dorado's refining installation. Various points are indicated by arrows at which temperatures are checked in this high-speed operation.

. . . **6**—The air blower on El Dorado's F.C.C. unit has a 2,000-hp. motor, which is water cooled. Note cooling water piping. Blower appears at left, and bearing-temperature check points are indicated by arrows at left end of the blower. The El Dorado refinery has a daily crude-oil-charge capacity of 12,000 bbl.



6 Motor on air blower for F.C.C. unit at El Dorado plant is 2,000 hp. Air blower is at left. Arrow indicates bearing temperature check points.

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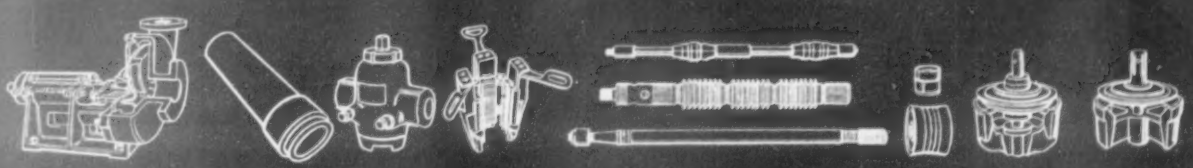

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How Rising Cost of Gas Affects Gasoline and Cycling-Plant Economics

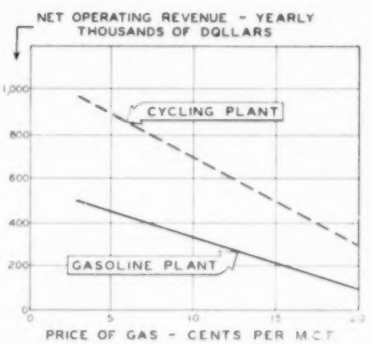
As the value of gas increases, fuel and shrinkage losses become more and more of a major economic factor. With shrinking profit margin, it is imperative that operating cost per gallon be shaved, investment cost per gallon reduced, and that effort should be devoted to creating markets which permit a fair return on investment.

by Harold E. Vaughan*

RECENTLY, gas contracts have been negotiated in the Gulf Coast area of Louisiana, starting at 20 cents per 1,000 cu. ft. for deliveries beginning in 1954 and escalating to higher prices during the term of the contract. These prices establish a trend and set a pattern of the future worth of natural gas in the field.

This upward swing of natural-gas prices has a more far-reaching effect than increasing the price consumers beyond the field must pay. It affects directly and most vitally the operation of all gasoline and cycling plants. How does this increasing gas price (3 cents in the 1930's and early 1940's to 20 cents in 1954 in the South) affect gasoline and cycling-plant economics? The accompanying chart gives an idea of what happens to the net operating revenue of plants when operating conditions and other expenses remain the same and only the price of gas fluctuates.

The solid line represents the economic effect of the increasing gas price on a gasoline plant; the broken line shows the effect on a cycling plant.



Economics of plants versus increasing cost of gas.

Gasoline-plant revenue . . . The gasoline plant represented processes about 82 million cubic feet of gas per day from which is extracted about 83,000 gal. of propane, butane, and casinghead gasoline. Most of the gas is processed at 400 psi. In this example, the only gas charged against plant operations is plant shrinkage and that used in the boilers and the recompressor engines.

All power in the plant, whether steam or electric, receives its basic energy from gas, except for the purchase of about 11,600 kw.-hr. per day from an outside source. Total gas consumption amounts to 6.2 million cubic feet a day. All residue gas is credited back to the producers. Assuming the value of gas used in plant operations is charged to the plant, we note that when the value of gas is 3 cents per M.c.f., the annual net revenue before income tax is $493,027.

With a price of 10 cents per M.c.f., the revenue is reduced to $334,617, or 32.13 per cent. When the value of the gas is increased to 20 cents the revenue dwindles to $108,317, or is reduced 78.03 per cent below that when the price is 3 cents.

Cycling-plant revenue . . . In a fair-size cycling plant, processing 173 million cubic feet of gas per day and manufacturing 265,000 gal. of salable liquid products from all sources, including distillate, about 10.8 million cubic feet per day are consumed in plant shrinkage and in compression, extraction, and manufacturing operations. At 3 cents this represents $118,260 a year for gas used in the plant operations. At 20 cents per thousand cubic feet, the figure increases to $788,400.

Net revenue before income tax decreases from $975,409 per year at the 3 cent gas value to only $305,269 when gas is worth 20 cents per thousand cubic feet, or a reduction in net operating revenue of 68.70 per cent.

Of course, many other factors are also helping to reduce the net operating income in natural-gasoline and cycling plants:

- In the last few years, federal, state, and local legislative bodies seem to have found it convenient to increase taxes on the industry almost every time more money was needed by the governments.
- Wages have steadily increased, better than doubling those paid in the early 1940's.
- Cost of all materials used in such plants have at least doubled and in some cases trebled during the past 12 years.
- Sales prices of liquid products have not kept pace with increased cost of production.

As the price of gas increases the trend is to reduce pressure-maintenance and cycling operations. Naturally, there is a point beyond which the cost of such operations would exceed the value of the additional liquids that could be recovered. This not only shortens the life of the plant, but causes a loss of liquid reserves to the plant and producer.

Residue gas prices . . . To those not familiar with the natural-gasoline business, it would appear to be especially favorable for the plant to sell its residue gas at a higher price. However, such is not always the case. Whereas, for many years it has been the policy to charge the producer a certain amount for boosting gas to pipe-line pressures, such policy is now often questioned due to the fact that plant operating pressures have been raised to pressures substantially the same as that of the pipe line in order to obtain a maximum hydrocarbon extraction.

Since the plant operates at the pressure to which the gas is boosted for sales, the producer who furnishes the gas to the plant asks for a larger share of the residue gas and liquid products as the value of gas goes up. Thus, many plants may find their income increased comparatively little in relation to the

*Continental Oil Co. Presented at the annual meeting, N.G.A.A., Houston.

increasing gas price and in some cases their income may be actually decreased.

It must also be considered that if the value of the liquid products do not increase proportionately with the increase in the value of the gas, a point is reached where there isn't enough difference between the price of the unprocessed gas and the value of the gas converted to liquid through a plant process to justify installation of the plant. Of course, in the case of rich gas, it may be necessary to remove some of the liquefiable hydrocarbons to make the gas salable to gas-transmission lines, even though the construction and operation of a plant cannot otherwise be justified.

Casing-head payment . . . At the present time, there is a tendency in certain state legislatures toward enactment of regulations requiring the payment for casing-head gas to be made at well head. This may be another setback to the natural-gasoline manufacturer, inasmuch as the extraction losses, fuel losses, and various other usages must be deducted from the volume produced before the gas is finally sold to the purchaser. The result of this practice, if it should become law, would mean that it would not be economically feasible to construct natural-gasoline plants in many fields which would, under more equitable regulations, support such plants.

In the recent past, the major factors entering into the calculation of profitability of a proposed plant have been the quality, quantity, and longevity of the casing-head gas supply. The better all three of these conditions were, the more advantageous the contract that could be made and conversely, the poorer the conditions, the less advantageous was the contract entered into. But at least conservation was practiced and the liquefiable portion of the gas not wasted. The advent of any regulations which would call for all casing-head gas to be of equal value would materially limit plant construction and cause a less advantageous use of natural resources.

Cost measures . . . The increasing value of gas is probably the greatest factor presently challenging the natural-gasoline and cycling-plant phase of the industry. Gas prices will continue to increase until a level with other fuels has been reached. Little can be done about high taxes, wages, and cost of materials, or the low prices of salable products from these plants. Then what can be done to protect the plants' net income? Several things can and must be done if gasoline and cycling plant operations are to continue on a sound economic basis:

1. Perhaps the first and most logical step to take in approaching this problem is to examine some of the most important costs that can be controlled from day to day:

- **Labor** is always a large item. A job analysis of the plant personnel may reveal that, by better planning and possibly better organization, the over-all operation can be accomplished more efficiently with less manpower.
- **A maintenance program** with emphasis on "preventive maintenance" requires continuous attention and is always open for improvement toward reducing operating costs over the life of the project.
- **By closer supervision** over plant operations and plant control tests, the maximum production can be obtained and cost of chemicals reduced to a minimum.
- **The quantity of gas used** can usually be reduced by eliminating actual waste such as that which is being flared and reducing steam and electric power consumption to the bare minimum requirements for efficient plant operation.
- **A cost-conscious responsibility** instilled in each employe through plant educational programs will pay dividends.

2. The development of new products and new uses for old products is a key factor in the economy of any industry faced with increasing cost of raw materials or with increased value of materials formerly considered waste. The rapidly growing petrochemical industry has been developed almost entirely by the application of this principle. Of course, design and operating efficiency must go hand in hand with product development.

The natural-gasoline and gas industry has been faced with this problem before. In the early days, butane was wasted. Then a market was created. This added to the plants' income with relatively small investment. In the late 1940's, many new plants were built with high butane and propane-extraction efficiencies. The very limited market was insufficient to handle the volume of products that could be produced.

An intensive advertising campaign in 1950 and 1951 aided materially in increasing the demand for propane and butane. An ethane-rich fraction can be added to the list of plant products. Possibly more favorable markets for these products can be obtained through closer cooperation and coordination with the rapidly growing petrochemical industry.

3. The factors working against plant profits are a definite challenge to plant designers and equipment manufacturers. Their future business is dependent on improved designs and processes and better and more efficient equipment.

Gasoline and cycling-plant design was developed in that era when residue gas was considered almost valueless. This factor led to a design basis different from that of nearly any other industry. Efficient utilization of plant fuel was not considered important. This fact is evidenced by the general lack of consideration of economical thermodynamic balance in gasoline plants. Now it is necessary to pay more attention to such things as efficiency of insulation, heat-transfer rates, and burner, boiler, and heater efficiencies.

In many instances, gasoline-plant design has not provided for maintenance access and facilities comparable to that provided in other industry plants. Proper facilities for maintenance and access have proved to be economical in refinery and chemical plants. They certainly deserve more consideration in gasoline-plant layout.

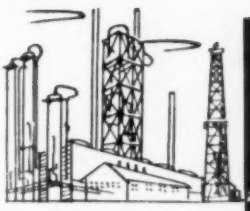
The two preceding points require some additional outlay of capital in building a plant, but pay for themselves many times over in savings in operation and maintenance. Thorough economic studies should be made to determine their application to existing installations.

Competent design . . . Another point, probably more critical to over-all economics than either of the others, is competence of the design organization responsible for the plant. Even a competent organization must be given the time for the application of its knowledge. The mechanical design and layout of a gasoline plant runs 1 to 2 per cent of the total job cost. That figure could be doubled without materially increasing the construction cost of the plant.

This additional design expense will usually actually reduce the outlay for equipment, materials, and labor by several times the amount expended on engineering. It is possible to consider more alternates to process and equipment specifications, and to ascertain that the answers arrived at are the most economical for the plant in question. Construction and operating procedures can be given more weight and the plant tailored to its specific needs, bearing in mind the salvage value of the equipment in connection with the anticipated life of the plant.

Actually, this item very seldom increases the over-all investment in a plant, and almost always results in more economic construction and operation. It is false economy to skimp on engineering. That is the basis for investment and operating costs that determine the economic feasibility of any plant.

by R. W. Brooks*



THE JOURNAL'S WEEKLY
Engineering Reference
SECTION

COMPRESSOR CALCULATIONS—6

Sample Compressor Calculations

SAMPLE calculations are given in this concluding installment to illustrate the method of computation.

Example 1

Given: Natural gas of 0.68 specific gravity, 1,075 B.t.u. heating value, and 8 per cent nitrogen.

Suction conditions: 500 psig. and 80° F.
Discharge conditions: 800 psig.

Determine: (a) Discharge temperature. (b) Horsepower requirements. (c) Cooling load to reduce temperature of gas to 100° F.

From installment No. 1 (The Oil and Gas Journal, April 20) for pseudocritical temperature and pressure by Dunkle's method:

$$T_c = 152.5 + 345.4\ (0.68) - 272.2\ (0.08)$$

$$T_c = 365°\ R.$$

$$T_R = T_1/T_c = 540°\ R./365°\ R. = 1.48$$

$$p_c = 685.8 - 23.1\ (0.68) - 171.4\ (0.08)$$

$$p_c = 656\ psia.$$

$$p_{r1} = p_1/p_c = 500/656 = 0.762$$

(a) Discharge temperature:

From Fig. 4 of installment No. 3 (The Oil and Gas Journal, May 4):

Initial point 500 psig. and 80° F. and moving parallel to isentropic guide line to 800 psig.

$$t_2 = 153°\ F.$$

k (ave.) at 650 psig. = 1.382

Check discharge temperature by calculation:

$$T_2 = 540\ (815/515)^{(1.382-1)/1.382}$$

$$T_2 = 0.613°\ R. = 153°\ F.$$

(b) Horsepower requirement:

$$THP = \frac{Z_1\ R\ T_1\ k}{(k-1)}\ [(p_2/p_1)^{(k-1)/k} - 1]$$

$$Z_1 = 1 - e^{(1.163-2.328\ 11.45)/3}\ (0.762) + 0.00605\ (0.762)^2$$

$$Z_1 = 0.926$$

$$THP = \frac{(0.926)\ (1.987)\ (540)}{(0.278)}\ (1.137 - 1)$$

$$THP = 485\ B.t.u./lb.\text{-}mol$$

$$THP = 485\ (0.0432) = 20.9\ hp./M.M.s.c.f.\ per\ day$$

From Fig. 1 (installment No. 4, May 11) and Fig. 1 (installment No. 5, May 25):

$$E_k = 0.78\ (1.02),\ E_c = 0.92$$

$$B.HP. = \frac{20.9}{(1.02)\ (0.78)\ (0.92)}$$

$$= 28.5\ hp./M.M.s.c.f.\ per\ day$$

(c) Cooling load:

Compressor discharge temperature 153° F. Desired temperature of gas going into pipe line 100° F.

$$T\ (ave.) = \frac{153° + 100°}{2} = 126.5°\ F.$$

From Fig. 3 (installment No. 3, The Oil and Gas Journal, May 4):

$$C_p = 10.70$$

$$Q = 10.70\ (153 - 100) = 567\ B.t.u.\ per\ lb.\text{-}mol$$

$$Q = 567 \times \frac{10^6}{379 \times 24}\ 62.4 \times 10^3\ \frac{B.t.u.}{hr.\ (M.M.s.c.f.\ per\ day)}$$

Example 2

Given: Natural gas without diluents, 0.55 specific gravity.

Suction conditions: 100 psig. and 60° F.
Discharge conditions: 300 psig.

Determine: (a) Discharge temperature. (b) Horsepower requirement. (c) Cooling load to reduce temperature to 100° F.

From installment No. 1 (The Oil and Gas Journal, April 20):

$$T_c = 342.5$$

$$p_c = 673.1$$

Compression ratio $p_2/p_1 = 314.7/114.7 = 2.74$

$$p_R\ (ave.) = 200/673 = 0.298$$

(a) To calculate discharge temperature, estimate approximate average temperature from Fig. 4, installment No. 3 (The Oil and Gas Journal, May 4).

Initial point 100 psig. and 60° F. and moving along isentropic guide line to 200 psig.

Estimate t (ave.) = 140° F. or 600° R.

$$T_R\ (ave.) = 600/342.5 = 1.755$$

From Fig. 2 (installment No. 3, The Oil and Gas Journal, May 4):

$$k\ (ave.) = 1.263 \times 1.04 = 1.313$$

$$T_2 = T_1\ (p_2/p_1)^{(k-1)/k} = 520\ (2.75)^{0.313/1.313} = 661°\ R.\ or\ 201°\ F.$$

A trial-and-error solution based on the mean temperature computed from the initial and a selected final temperature results in:

$$T_2' = 203°\ F.$$

(This method presupposes a straight line isentropic compression path.)

As a criterion of the accuracy of the two methods, the final temperature was determined by calculating the temperature increase over small increments of pressure between 100 and 300 psig. giving:

$$T_2'' = 201°\ F.$$

substantiating the accuracy of the illustrated method.

(b) Horsepower requirement:

$$THP = \frac{Z_1\ R\ T_1\ k}{k-1}\ [(p_2/p_1)^{(k-1)/k} - 1]$$

$$Z_1 = 0.987$$

$$THP = \frac{(0.987)\ (1.987)\ (520)}{0.241} \times [(2.74)^{0.241/1.241} - 1]$$

$$= 1{,}162\ B.t.u.\ per\ lb.\text{-}mol$$

$$= 1{,}162 \times (0.432) = 50.3\ hp./M.M.c.f./day$$

From Fig. 1 (installment No. 4) and Fig. 1 (installment No. 5):

$$B.HP. = THP/E_c E_k$$

$$E_c = 0.82,\ E_k = 0.98$$

$$= \frac{50.3}{(0.82 \times 0.98)} = 62.7\ hp./M.M.c.f./day$$

(c) Cooling load:

Compressor discharge temperature 201° F. Desired discharge temperature 100° F.

$$T\ (ave.) = \frac{100 + 201}{2}$$

$$T\ (ave.) = 150.5°\ F.$$

$$T_R\ (ave.) = 610.5/342.5 = 1.782$$

From Fig. 1 (installment No. 3, May 4):

$$C_p° = 9.13$$

$$p_{R2} = 300/673 = 0.446$$

Fig. 1-B (installment No. 3):

$$\Delta C_p = 0.33$$

$$C_p\ (ave.) = C_p° + \Delta C_p$$

$$C_p\ (ave.) = 9.13 + 0.33 = 9.46$$

$$Q = 9.46\ (201 - 100) = 955\ \frac{B.t.u.}{lb.\text{-}mol}$$

$$Q = 955 \times \frac{10^6}{379 \times 24} = 105.0 \times \frac{B.t.u.}{hr.\ (M.M.s.c.f./day}$$

*Pacific Gas & Electric Co. From paper presented at Pacific Coast Gas Association conference, Los Angeles, 1953.

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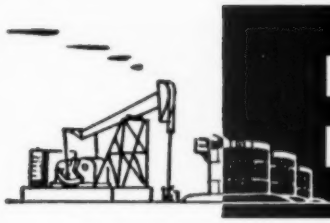

ENGINEERING FUNDAMENTALS

The Lorenz Factor—A Measure of Degree of Heterogeneity

by Ralph F. Nielsen*

LAST week's installment of this series dealt with the calculation of the production history of an air drive imposed on a series of non-communicating parallel horizontal reservoirs. The vertical permeability profile was expressed as a smooth curve assuming the permeability to decrease gradually with height. There is, obviously, an infinite variety of ways in which the permeability can vary with height, even when the streaks are arranged in order of increasing or decreasing permeability. That is, there are degrees of heterogeneity varying from uniform permeability to a mixture of very low and very high permeabilities. Fig. 1 shows three different degrees of heterogeneity.

In the mathematics of statistics there are certain quantitative measures that have been developed for expressing the degree of variation among a series of samples of any kind. The definition of such a measure depends on the use to which this measure is to be put. A measure of heterogeneity which has been proposed[1] for permeability profiles is known as the Lorenz factor.

* Associate professor, petroleum and natural-gas engineering, Pennsylvania State College.

STARTING NEXT WEEK . .

A new series on electric logging, written by R. J. Martin, department of petroleum engineering, Missouri School of Mines and Metallurgy. The material is prepared to meet the needs of technical personnel who deal with electric logs.

Dr. Nielsen will continue to make contributions to this page from time to time, as well as write longer articles on production for the engineering-operating section.

To calculate the Lorenz factor, it is necessary to have a plot of height against the per cent of total cumulative permeability capacity up to that height (Fig. 2). The latter is obtained from the area under the permeability profile curve (Fig. 1) up to the desired height, divided by the total area under the profile curve. The Lorenz factor is defined as the area between the curve and the diagonal of Fig. 2, divided by the area under the diagonal.

It is apparent that, for the same height, permeability profiles can have the same Lorenz factor but different cumulative capacities. If the permeability is uniform, a diagonal line would be obtained on a plot such as that of Fig. 2, hence the Lorenz factor would be zero. However, the higher this uniform permeability, the higher the cumulative capacity.

The Lorenz factors are indicated on the permeability distribution curves of Fig. 1. Profiles 1, 2, and 3 have the same cumulative capacity, 4,000 md. ft. It is seen that the closer the Lorenz factor is to unity the greater the degree of heterogeneity. Curve 4 corresponds to a higher cumulative capacity. Theoretically, a Lorenz factor of unity would mean zero permeability over the whole height except for an infinitesimal layer of infinite permeability.

Production histories for two profiles of the same cumulative capacity, as calculated by the method of the last number of this series, are shown in Fig. 3. As would be expected, the greater the degree of heterogeneity the less efficient the process.[2]

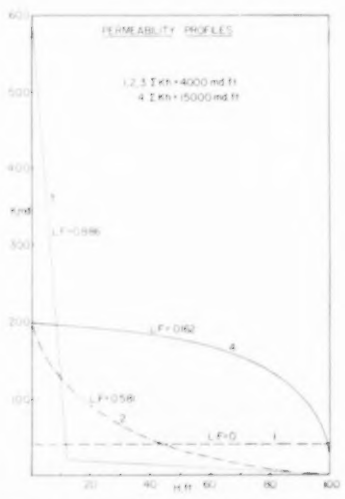

Fig. 1—Permeability profiles of various degrees of heterogeneity. (Lorenz factors.)

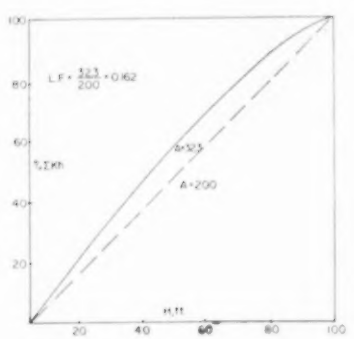

Fig. 2—Calculation of Lorenz factor.

References

1. Schmalz and Rahme, Producers Monthly, August 1950.
2. Stahl and Nielsen, Producers Monthly, August 1951.

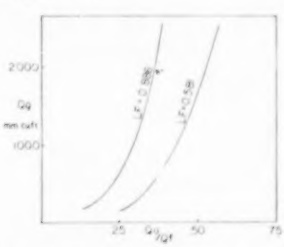

Fig. 3—Gas volumes necessary to produce a given fraction of the theoretically recoverable oil.

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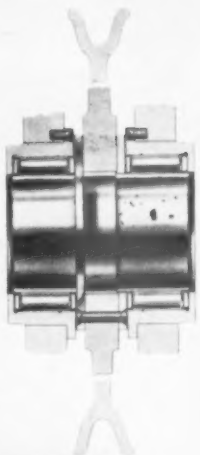

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Self-Cleaning Antimony pH Electrode

by Porter Hart* and R. C. King†

DESPITE the advances made in the development and application of the glass electrode for pH measurements in recent years, there are still a number of applications for the antimony electrode. In solutions containing no oxidizing or reducing agents, the antimony electrode has advantages which merit serious consideration, especially at high pH levels. The measuring circuit is of fairly low impedance so that an ordinary potentiometer instrument without special insulation and shielding can be used. The readings obtained are quite reliable and reproducible so long as the surface of the antimony is continuously cleaned of the reaction products.

Various motor-driven cleaners for the commercial antimony electrode have been used. However, at best these cleaners require considerable maintenance. Since the sample is almost always available under pressure, this pressure energy can be used to make the electrode self-cleaning.

The unit shown in Fig. 1 is the resulting form of this self-cleaning assembly. The electrode is an annular ring of antimony clamped between two machined disks of insulating material, forming a chamber or race in which an ordinary glass marble can circulate. The sample inlet is tangential to the chamber so that the force of the liquid causes the marble to rub along the surface of the antimony. The outlet from the chamber is in the center through a saran tee into which the KCl reservoir for the reference electrode is inserted.

Only a few feet of liquid head is required to furnish enough energy to cause the marble to keep the antimony surface clean.

*Superintendent, instrumentation, and †assistant superintendent, instrumentation, Dow Chemical Co., Freeport, Tex. Presented at symposium on Instrumentation for the Process Industries, A. & M. College of Texas, 1953.

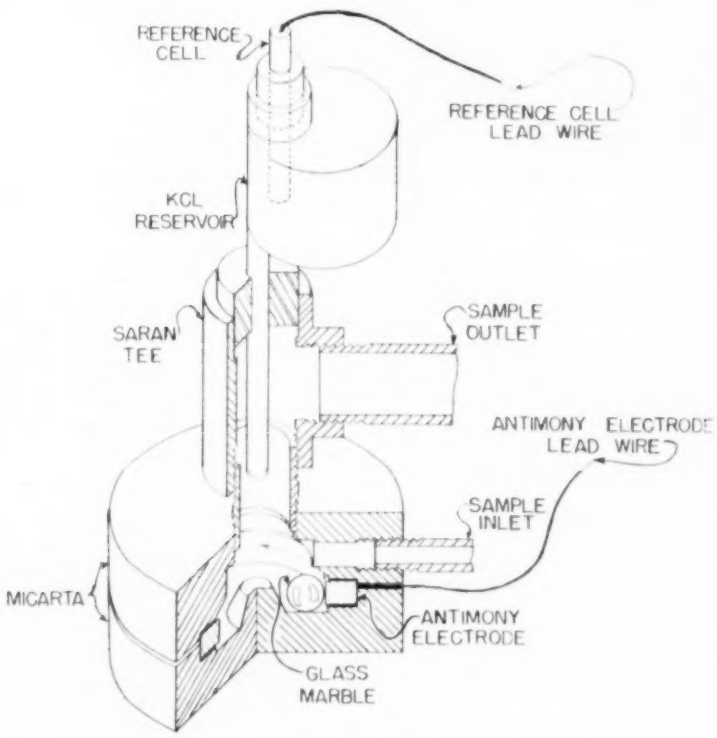


Fig. 1—Self-cleaning antimony pH electrode assembly.

The Little Man

HAND wheels and hand jacks are sometimes attached to control valves in order to prevent the valve from closing entirely. This provides a minimum opening of the valve at all times for safety or certain operating conditions. It is inconvenient and rather expensive to add hand jacks to control valves, particularly those with the positioner on top of the operator directly above the valve stem. For this application a pneumatic hand jack was made which our operating department refers to as "The Little Man," because it keeps a constant watch over the control valve.

The device itself was made from an inexpensive pressure regulator of the type used in air supply to instruments. The relief port of the regulator must be soldered closed so the downstream pressure from the regulator cannot bleed back through it. In operation, the pneumatic hand jack is set to deliver directly into the control air line to the valve, a pressure corresponding to the minimum opening desired on the control valve. If the output pressure from the controller falls below this set pressure, air will be supplied by the pneumatic hand jack. This air will also bleed back through the controller nozzle. As long as the output pressure from the controller is above the minimum set pressure, the valve operates normally and no air can bleed back through the plugged relief port of the hand jack regulator.

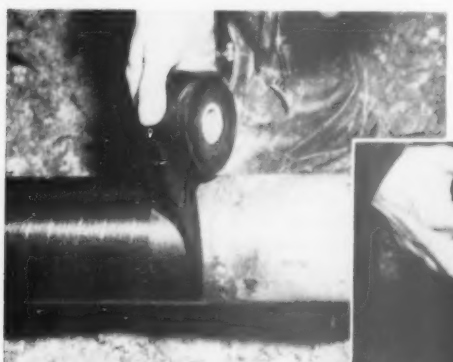
DRESSERTAPE ... the name that means

QUALITY PROTECTION

... against corrosion

Gas men for over 50 years have known that any product bearing the Dresser name really does the job for which it is made. Before recommending Dressertape to you, *we* made sure it would work—give you the lasting protection you need. Now, we ask you to try it, with the same confidence you have in other Dresser products.

Dressertape can save plenty of expensive man-hours and cut your over-all costs on every job where pipe protection is required—because it's faster, simpler, more effective.



Welded joint is quickly and permanently protected by Dressertape without special surface preparation.

Complete, uniform coverage of irregular joints and fittings is easy with Dressertape. No gaps, voids or holidays.

LOOK AT THESE OUTSTANDING DRESSERTAPE FEATURES!

- Easy, clean to apply—sticks at a touch, no heating equipment required.
- Safe to use—no burns, no fumes.
- Conforms to irregular surfaces—especially over fittings on service lines.
- Immediate backfill—no waiting.
- Exceptional electrical properties—dielectric strength: 10,000 volts; insulation resistance: 100,000 megohms.
- Lasting protection against water, oil and soil chemicals—equal to or exceeding yard or mill-wrapped pipe.

a Dressertape is a trade-mark of Dresser Manufacturing Division

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MANUFACTURING DIVISION
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Warehouses: Houston, Texas and South San Francisco, California

Gentlemen: ☐ Please send detailed information and literature about Dressertape.

☐ Please have your sales engineer call with Dressertape samples.

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SAFETY BELT

Because a life may depend on it, finest quality – in both materials and construction – comes first with McDonald Safety Belts!

Lightweight, easily adjustable, super-tough—McDonald Safety Belts assure maximum safety and working comfort whatever the job.

Famous Insta-Release Buckle—to allow split-second belt removal – is only one of the features offered by this better, safer line of belts! McDonald belts are manufactured, inspected and tested in our own plant. If desired, they can be custom-made to your specifications.

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Equipment for Conducting Survey

A CLOSEUP view of an anode and cathode area, discovered during a corrosion survey along a pipe line, is shown in Fig. 14 (figures are numbered consecutively for continuity in this series). (Part 4) When both sets of arrows are pointing in the same direction, the potential read on the high-resistance voltmeter is the sum of the potentials of the natural anode and the copper sulfate half cell, producing the high reading shown at Station 350. This represents an anode area along the pipe line. Such a potential reading indicates that current is flowing from the pipe to ground, with resulting corrosion.

The right half of Fig. 14 shows two sets of arrows pointing in opposite directions indicating that the current flowing onto the pipe at a cathode area is bucking the potential of the copper sulfate half cell, resulting in a lower reading on the voltmeter. Such cathode areas do not corrode.

When it becomes necessary or desirable to conduct such a survey along a Dresser coupled or composite line, the survey crew must be careful to be sure that they obtain contact with each section of pipe between all Dresser couplings or other insulating joints. Of course, such a precaution is not necessary on screw or welded lines.

After the anode and cathode areas have been located, as shown in Figs. 13 and 14, it is possible to determine, by the use of an instrument called an earth current meter (Fig. 15), the intensity of the action at these anodes and cathodes.

To use the earth current meter, it is necessary to bore a 2-in. hole from the surface of the ground to the top of the pipe. Part of the instrument, called a cantilever electrode (Fig. 16), is inserted and pressed into the earth at the bottom of the 2-in. hole. The leads are then connected to the earth current meter, and a series of readings taken, from which it is possible to calculate the current flowing in the earth (electrolyte) adjacent to the underground pipe.

From the readings obtained, the intensity and direction of the current flow are calculated. Later on, these readings can be used to determine the necessity, nature, and kind of protective measures to be employed if any are necessary.

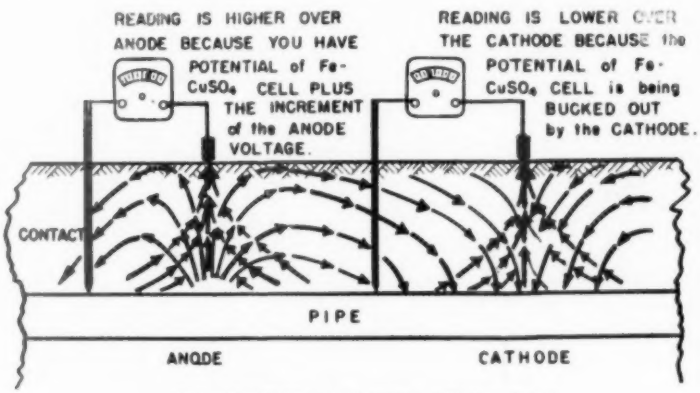
READING IS HIGHER OVER ANODE BECAUSE YOU HAVE POTENTIAL of Fe-CuSO4 CELL PLUS THE INCREMENT of the ANODE VOLTAGE.
READING IS LOWER OVER THE CATHODE BECAUSE the POTENTIAL of Fe-CuSO4 CELL is being BUCKED OUT by the CATHODE.
CONTACT
PIPE
ANODE
CATHODE

Fig. 14—Field use of copper sulfate half cell.

*Taken from A Manual on Underground Corrosion, Colombia Gas System Service Corp. Part 4 of this series appeared in the January 26, 1953, issue of the Journal, page 407.

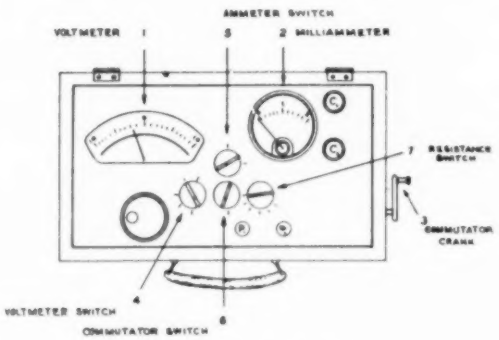

Fig. 15—Earth current meter.

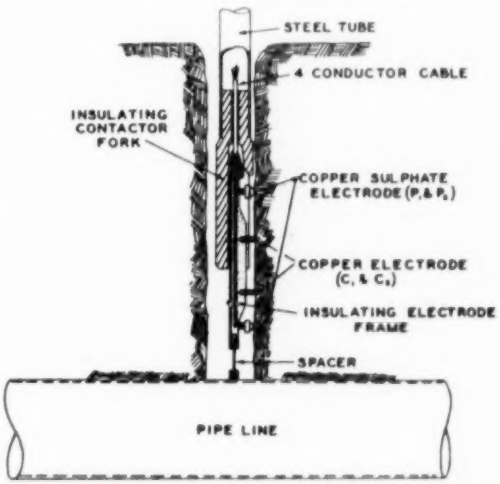

Fig. 16—Cantilever electrode.

Part of the welding floor at Grinnell's Warren, Ohio Plant

How shop fabrication of piping

keeps costs down...quality up!

When you specify piping fabricated in Grinnell shops, you are ALL to the good.

Here's why: — Included in the price (which is determined in advance) are such items of expense as:

- Interpretive engineering
- Shop sketches and planning
- Procurement of materials
- Heat, light, power, water, compressed air, expendable tools and supplies

But Grinnell even goes further. Grinnell finances material inventories and payrolls for you; carries insurance; makes no charges for waste material or spoilage.

On the production side, too, you benefit. Piping fabricated in Grinnell shops is done under ideal conditions, with modern equipment, by personnel qualified for each class of work. It is rigidly inspected and tested to meet customer's specifications and all applicable codes. Before shipment, it is cleaned inside and outside and painted. It is squared to dimensional tolerances, so that sub-assemblies can be erected at the job site quickly and easily.

You can count on it . . . Grinnell shop fabricated piping *guarantees* maximum quality and economy.

Heavy wall pipe being machined to the proper welding bevel on a post mill

Welding (induction heating coils in place for preheat, welding heat and stress relieving.)

GRINNELL

WHENEVER PIPING IS INVOLVED

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

Use and Care of Wire Rope—10

. . . Alignment of Wire-Rope Carriers

ALL ropes operating over sheaves or drums are subjected to bending stresses. Wires in the ropes fatigue and the degree depends upon the ratio of the diameter of the rope to that of the sheave or drum. Fatigue from severe bending is frequently the main reason for short rope service.

It is impossible to determine this stress with any degree of accuracy due to the makeup of the rope itself. The wires in a strand are laid in a helix around a central wire, and the strands in turn form a second helix around the rope core. This is quite different from the conditions present in a solid bar of steel.

To bend around a sheave both strands and wires must move in relation to each other. The distance around the sheave is greater along the top of the rope than on the underside next to the groove. Excessive pressure due to a small-diameter sheave retards this movement. Lack of sufficient lubricant is also a factor.

A change in direction from one sheave to another should be avoided wherever possible as this reverse bending results in rapid wire failure. Rope speed is another factor to be considered. High rope velocity requires relatively larger sheaves to insure good rope service than for a slow-moving rope.

DIAMETER TOLERANCES OF WIRE ROPE

Nominal diam. in inches	Undersize inches	Oversize inches
0 to ¾	0	1/32
13/16 to 1⅜	0	3/64
1 3/16 to 1½	0	1/16
1 5/16 to 2¼	0	3/32
2 5/16 and larger	0	⅛

Sudden Stresses

Overloading and the creation of sudden stresses are to be avoided as they are causes of wire-rope deterioration and ultimate failure. If slack accumulates during a no-load period this should be taken up slowly before the full load is engaged. Tests have been made with varying amounts of slack, and tensions of 2½ to 3 times the dead load are reported with 12 in. of slack at the end of a shaft rope.

Overwinding and Crosswinding

It was mentioned under the subject of "Cutting Off Ends" that the winding of more than one layer on a drum frequently resulted in some damage to the rope. When a rope winds irregularly on a drum with one wrap crossing over another, without forming smooth layers across the drum, the action is referred to as crosswinding. This produces excessive and concentrated pressure resulting in abrasion and distortion of the wires and dog legs in the rope. Even with no crosswinding or piling up of the wraps, a rope is subjected to a certain amount of abuse at the crossover points in the second and subsequent layers and at the flange where the rope turns back on the following layer. The larger the drum, the less severe the pressure will be of one layer on the one underneath. Abuse at the flange can be reduced by the installation of a guide to raise the rope from the first to the second layer, or a shaped plate may be attached to the inner face of the flange.

Inspection

A rope should be frequently inspected to note the progress of abrasion and wire fatigue. By so doing the useful life of a rope can be prolonged. Cuts can be made in time at one end or the other as described elsewhere, or the rope turned end for end.

On account of the fact that a wire rope is made up of many parts, it does not wear out all at once unless it meets with an accident. Deterioration develops gradually and wires are broken successively rather than simultaneously. When wires break in this way they will give warning that a rope failure is imminent.

Fleet Angle

The fleet angle is the included angle between a line representing the greatest travel of a rope across a drum, and a line drawn through the center line of the head or guide sheave at right angles to the axis of the drum. This angle should not exceed 1½° for a smooth drum or 2° when a grooved drum is used.* When the lead sheave is too close to the drum and these angles are exceeded, the rope will scrub against the preceding wrap or tend to climb on itself near the end of its travel. When starting to wrap on a smooth drum, if the angle is too great the rope will pull away and tend to leave open spaces. With a second layer the wraps will fall into these openings. Either condition will be detrimental to the rope, and cause wear on the flanges of the guide sheave.

*An angle of 1½° = about 3 in. in 10 ft., or 38 ft. between drum and sheave for every foot of travel on drum. An angle of 2° = about 4 in. in 10 ft., or 29 ft. between drum and sheave for every foot of travel on drum.

Taken from Bulletin 61, Use and Care of Wire Rope, A. Leschen & Sons Rope Co.

QUESTIONS ON TECHNOLOGY

by W. L. Nelson
Technical Editor

Cost of Handling and Firing Coal or Fuel Oil—2

This is a continuation of P.G.'s question of last week.

IN the May 25 issue of this page it was shown that the erected cost of coal and ash handling systems ranged from $800 for the smallest plants (300 tons per year) to $65,000 for a 30,000-ton per year plant; that the cost of power, of thawing frozen coal, etc., was small; and that any extensive use of manual labor was prohibitive in cost. In summarizing all of this information (taken largely from Bull. No. 14, December 1951, of the Fairmont Coal Bureau, entitled "Coal and Ash Handling"), the cost of handling and firing coal in various sizes of plants is indicated in Table 2. The Fairmont Bulletin also concludes that the cost ranges from 50 cents to one dollar and that the cost need never exceed $1.00 per ton. They did not, however, nor does Table 2, include the depreciation and maintenance of coal pulverizing or stoker equipment. Such equipment costs vary much more than costs of oil burners:

		Cost		Depreciation and maintenance cents per bbl. oil	
Tons per year	Bbl. per year	Burners	Stokers or Pulverizers*	Oil (15%)	Coal (15%)
300	1,240	$ 210		1.7	
1,500	6,200	270	10,000	0.4	24.2
5,000	20,600	740	25,500	0.4	19.5
15,000	61,800	2,100	65,000	0.3	15.8
30,000	124,000	3,700	99,000	0.3	11.9

* Approx. based mainly on page 319 of Zimmerman and Lavine, Chem. Eng. Costs.

Thus the costs of Table 2 are as follows when firing equipment as well as coal and ash handling equipment is included:

Ton per Year	$ per Ton
300	*$2.10
1,500	1.86
5,000	1.22
15,000	1.34
30,000	1.09

* Estimated.

Somewhat the same costs of handling coal are indicated in National Petroleum News.[1] When using large amounts of coal, as in petroleum refineries for fuel, the 1941 cost of (1) unloading and bunkering, (2) equipment for pulverizing or stokers, ets., and (3) additional maintenance costs of boiler and coal-preparation equipment, amount to a total of 15-50 cents per ton. Since 1941, these costs must have risen by at least 80 per cent which will make present day costs of 27 to 90 cents per ton.

A very complete analysis of actual plant tests when burning wood, wood slabs, coal, and oil is given by C. T. Baker [2,3] but his results cannot be analyzed directly for the cost of firing coal. Nevertheless, by examining his data, the extra costs of firing coal above the cost of firing oil, were found to be:

Oil price $/bbl.	Extra cost of coal firing, ct./ton.
1.00	28
1.50	42
2.00	56
2.50	70

If the cost of firing 4.12 bbl. of oil (the heating value equivalent of 1 ton of coal) is 30 cents, the costs of coal firing range from 58 to 100 cents per ton.

One expert has advised, perhaps thoughtlessly, that the cost of coal firing in 1950 ranged from 65 cents to the very high value of $2.70 per ton.

Cost of Handling Residual Fuel Oil

The operations involved in handling fuel oil can best be examined by comparing the handling of the two types of fuels:

1. Oil does not deteriorate or change materially during storage. It must be kept, however, in a tank whereas reserve coal can be piled on the ground at substantially no cost except that the coal pile must be turned over at intervals to keep it dry. Although more coal must be stored (on the ground) as insurance against strikers, etc., all of the reserve oil storage must be kept in tanks.

2. Fuel oil may be stored at a distance from the boiler, whereas it is always preferable to store coal as close as possible so that expensive long conveyors need not be maintained.

3. Oil-handling equipment involves no moving parts except the pump and perhaps the valves whereas in coal handling the wear is great on elevators, conveyors, bunkers, etc., and the maintenance costs are high.

4. Oil is handled totally in a closed mechanical system whereas the ash of coal and sometimes the coal itself must be handled by manual labor.

5. Although oil is more free from spontaneous combustion than is coal, more fires occur in the oil systems of power plants than in any other parts of the plant.

The design of systems for handling fuel oil is described in detail in four references.[4-7]

TABLE 2—APPROXIMATE COSTS OF HANDLING COAL, AND REMOVING ASH. CENTS PER TON COAL.

Plant size—tons/year	300	1500	5000	15,000	30,000
cars/year	6	31	104	312	625
	cents per ton coal				
Unloading—labor pool	9.5	9.5	8.5	8.5	7.5
Supervisor, pay checks, etc.		*2.0	*2.0	*6.0	*6.0
Power (or shoveling†)	†75.0	0.5	0.5	0.5	0.5
Assistant to fireman		‡40.0	‡12.0	‡5.0	‡6.0
Fixed charges§	†25.0	35.0	19.0	49.0	40.5
	109.5	87.0	42.0	69.0	60.5

* One-twelfth to one-half the time of one man for the largest plant.
† Shoveling in one-half of the smallest plants at a cost of about $1.50 per ton. Fixed charges of 50 cents in half the plants.
‡ One-sixth of a man's time in the small plant to one-half of a man's time in the largest.
§ Fifteen per cent per annum of the investments of Table 1 working at 80 per cent load factor.

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2. Baker, C. T.—Power Engineering, August 1951, p. 86.
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7. Hicks, T. G.—"Planning Power Plant Fuel Oil Storage Systems," Power Generation, June 1949, p. 66.

EQUIPMENT MEN . . . in the News

Midwestern Engine Names Personnel Appointments

Armon H. Bost, vice president and general manager of Midwestern Engine & Equipment Co., Inc., recently announced the appointment of W. F. Winkler as equipment sales manager of the firm. Norris E. Cott, formerly Mississippi Valley sales representative for Keystone Asphalt Products Co., was also recently named purchasing agent-sales coordinator for the company at Tulsa and Oklahoma City.

W. F. WINKLER

N. E. COTT

Winkler comes to Midwestern from Oliver Corp. where, for the past year, he has been directing that company's sales-training program. In March of this year Midwestern acquired the Oliver tractor line for the southwestern area, and staged a demonstration of the equipment at its modernistic new home office and shop at Tulsa. Winkler joined Oliver Corp. in 1945, and in 1948 he served as district manager of Oliver Pennsylvania-New York-Ontario territory where he was in complete charge of all industrial sales.

For a number of years Cott was with Keystone Asphalt Products Co., of Chicago, where he was employed as a salesman for heavy construction materials. During this time he traveled the Mississippi Valley, a territory which encompasses 21 states, and in 1951 he joined Glandon-Hughes Co., of Houston, as sales manager. Cott's new position at Midwestern will center around pipe-line equipment and supplies.

In an additional release Midwestern Engine has announced the full-scale activities of its new and modern industrial equipment repairing and overhauling facilities. The department will furnish routine and emergency repair and parts work on construction and oil-field equipment.

Concurrently with the announcement of the new service came the appointment of William K. McKenzie as head of Midwestern's equipment repair division. McKenzie was employed by Sinclair Oil Co. as a master field and rig mechanic before joining the Midwestern staff. He will be working with Roland C. Hill, who is in charge of the heavy equipment division, and Leonard Hanniford, head of the engine and small equipment division at Midwestern.

Davey Compressor Appoints Myers to Managerial Post

Appointment of R. G. Myers as southwestern district manager of Davey Compressor Co., Kent, Ohio, is announced by Paul H. Davey, president.

R. G. MYERS

Myers will be in charge of sales and service of Davey portable, industrial stationary and truck-mounted compressors in Texas, Oklahoma, Louisiana, Arkansas, and New Mexico.

Prior to joining Davey, Myers was St. Louis area service director for Twin Coach Co., with which he was affiliated for over 20 years.

Bovaird Supply Opens Houston Sales Office

O. C. KING

The opening of a sales office at Houston by Bovaird Supply Co., following the recent establishment of a completely stocked store at Lovington, N. M., enables Bovaird to extend its services to an important territory, including the Texas Gulf Coast area. The Houston office is under the direction of O. C. King, Houston sales representative.

King has been serving the oil and gas industry in Texas and Louisiana since 1924, according to Roscoe G. Ayers, vice president and general manager of sales for Bovaird.

Bovaird Supply now has 23 offices and stores in Oklahoma, Kansas, Illinois, Texas, and New Mexico. Other Texas offices and stores are located in Borger, Midland, Odessa, Snyder, and Dallas, Tex.

Mart Elected President Cooling Tower Institute

L. T. MART

Leon T. Mart, president of The Marley Co., of Kansas City, Mo., was elected president of Cooling Tower Institute at the recent annual meeting of the group in San Francisco. Other officers elected for the 1953 terms were Neal B. LauBach of Hudson Engineering Corp. of Houston, vice president; Paul R. Hoffmann of Lilie-Hoffmann Cooling Towers of St. Louis, secretary; Clayton E. Pickup of The Fluor Corp., Los Angeles, treasurer. Executive offices of the Institute at Palo Alto, Calif., continue under the direction of Raymond C. Kelly, executive manager.

Member companies, all major manufacturers of industrial water conservation equipment, are Foster Wheeler Corp. of New York City; J. F. Pritchard & Co., Kansas City, Mo., United Cooling Tower Co., Kansas City, Mo., Water Cooling Equipment Co., St. Louis, and C. H. Wheeler Manufacturing Co., Philadelphia, in addition to those firms represented by the new officers.

N.I.A.A. Conference to Be Held June 22-25

More than 1,500 industrial advertising executives are expected to attend the thirty-first National Industrial Advertisers Association conference in Pittsburgh June 22-25. Principal speakers will be: Col. John H. F. Haskell, vice president, New York Stock Exchange; J. K. Lasser, author, tax specialist and senior partner in J. K. Lasser & Co., New York accounting firm, and Tomlinson Fort, vice president, Westinghouse Electric Corp.

R. J. Ritchey, assistant general sales manager of Townsend Co., is general chairman of the conference. Serving with Ritchey are H. E. McDonald, Walker & Downing Advertising Agency, assistant general chairman, and the following committee chairmen: Robert C. Meyers, U. S. Steel Corp., awards; I. H. Bloom, direct-mail service, entertainment; R. H. Caffee, William G. Johnston Co., finance; John M. Clampitt, Aluminum Co. of Amer-

ica, publicity; T. J. Ess, iron and steel engineer, arrangements; B. S. Chapple, Jr., U. S. Steel Corp., program, and P. H. Vollmer, Blaw-Knox Co., promotion.

Dresser Industries Elects Johnson Vice President

W. M. JOHNSON

H. N. Mallon, president, Dresser Industries, Inc., Dallas, has announced that Willard M. Johnson, president of Magnet Cove Barium Corp., Houston, a Dresser subsidiary, was elected a vice president of the parent company, Dresser Industries, Inc.

Johnson formerly was executive vice president and director of Union Bank of Jamestown, Tenn. Subsequently, he organized Wolf River Corp., a barite mining company. In 1940, Johnson organized Magnet Cove and has been president of the company since that time. Dresser Industries acquired Magnet Cove in November 1949, and Johnson was elected a director of the parent company in November 1950.

Clark Bros. Promotes Van Campen, Barnes

The opening of a new Kansas City, Mo., district office has been announced by Clark Bros. Co., Olean, N. Y., manufacturer of engines, compressors, and turbines. The new office will be under the direction of A. G. Van Campen, former district manager for the company at Tulsa.

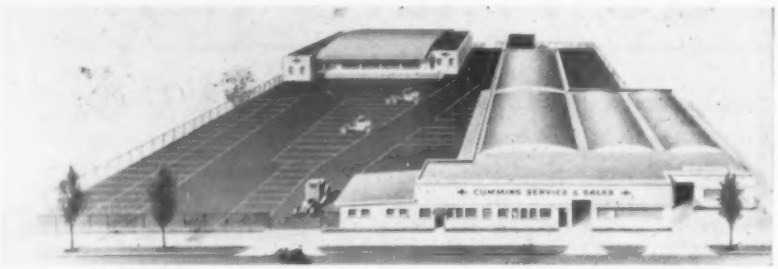
VAN CAMPEN

W. H. BARNES

To fill the position vacated by Van Campen at Tulsa, Clark has appointed William H. Barnes as district manager.

Both Van Campen and Barnes have had wide field experience. They will bring a thorough knowledge of all phases of compressor application to their new positions.

Cummins Service and Sales Remodels Los Angeles Plant



Remodeled and enlarged plant of Cummins Service & Sales, Los Angeles.

The Los Angeles plant of Cummins Service & Sales has been remodeled and enlarged to give fast and efficient service on engine rebuilding, repairs, and parts. A completely new building has been added where engines are rebuilt on a production line basis. Another new building has been added to house a double-end dynamometer which permits one engine to be tested while another one is being worked on.

The entire repair department has been reorganized to permit the greatest possible efficiency and supervision of 47 mechanics on duty. The parts department also has been reorganized in a more convenient location for customers.

Seven Key Promotions Made By Cooper-Bessemer Corp.

Seven promotions to key plant operating positions in its Mount Vernon and Grove City plants have been announced by Gordon Lefebvre, president of The Cooper-Bessemer Corp.

Tom McMichan, works manager, and Frank Stevenson, assistant works manager, of the Grove City plant, have been appointed special assistants to the president and will be stationed at headquarters in Mount Vernon. Willard Luli, formerly production manager, has been named works manager at Grove City. Hugh Stevenson, formerly superintendent, is now assistant works manager. Ken Martin has been appointed as production manager; Guy Gahagan, general superintendent, and Clarence Evans, shop superintendent, day shift, at Grove City.

McMichan, who has broad manufacturing experience, has been works manager at Cooper-Bessemer's Grove City plant since 1942. In his new position he will coordinate tooling and production methods between the two engine and compressor building plants.

Frank Stevenson has been with the company for 25 years, and has served as chief inspector, head of standards, night shop superintendent, and assistant works manager.

Luli came to Cooper-Bessemer in 1935 as a student engineer. He has served in the production department of the company, in the Washington office of the sales department, and as special assistant to assistant general manager in Grove City. He became assistant production manager in 1945 and production manager in 1947.

Hugh Stevenson joined Cooper-Bessemer in 1936 as an inspector, after having worked for some time as a tool maker for The Talon Co. He has been general superintendent at the Grove City plant since 1948.

Martin joined the inspection department at Grove City in 1941. He became chief inspector in 1945, and assistant production manager in 1952.

Gahagan started with Cooper-Bessemer in 1926 and has worked as tool maker, jig designer, chief planner, supervisor of followup and, since 1949, assistant superintendent of the day shift.

Evans came with the company in 1915 as a machine apprentice. Prior to his new appointment he was foreman of the tool room for 11 years.

Chicago Bridge & Iron Names Sangdahl Vice President

George S. Sangdahl was recently elected a vice president of Chicago Bridge & Iron Co. He has been associated with the company since January 1915.

Sangdahl was graduated with B.S. degree in engineering from University of Illinois in 1931. He began working in the sales department of Chicago Bridge & Iron doing design and estimating work, subsequently was manager of Montreal, Que., sales office of the company's Canadian affiliate, Horton Steel Works, Ltd., for 5 years, and has been manager of the company's Cleveland sales office since 1925.

On May 4 Sangdahl became mana-

ger of a new sales office which Chicago Bridge & Iron opened in Pittsburgh.

B.S.&B. Appoints Casey District Sales Manager

TOM CASEY

Jimmy Dvoracek, sales manager, controls and safety-head sales division, Black, Sivalls & Bryson, Inc., has announced the appointment of Tom Casey as Tulsa district sales manager for the controls and safety-head division. Casey has been with B.S.&B. for the past 7 years as a salesman in the Tulsa office. In his new capacity, he will have supervision of sales and service activities of the controls and safety-head division in the Tulsa sales district. He will headquarter at the B.S.&B. Tulsa plant.

Security Engineering Names Gallman Division Manager

W. B. GALLMAN

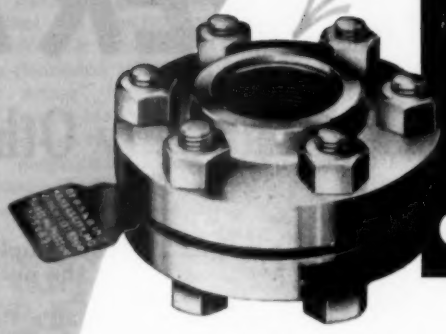
William B. Gallman has been appointed West Texas-New Mexico division manager for Security Engineering Division, Dresser Operations, Inc., it was announced recently by A. M. Birnie, general sales manager. In his new position, Gallman will have immediate supervision of all sales and sales personnel work in the West Texas area. Formerly with West Texas Rig Co., where he was general manager, Gallman brings to his new position an understanding of drillers' needs, acquired during his 21 years of experience in the oil business and related industries.

Welling, Woodard Establish Industrial Consultants Firm

Charles H. Welling and George H. Woodard have announced the establishment of a partnership to be known as Welling & Woodard Industrial Consultants. This new firm will specialize in new products and diversification combining individual practices which, for some years, have been conducted by Charles H. Welling & Co., industrial consultants, and George H. Woodard, new products engineer. Company offices will be maintained in New York City.

QUESTION:

When does weakness mean safety?



ANSWER:

Only When It's In BS&B Safety Heads

Safe, Sure Protection Against Overpressure within Pressure Vessels

Sudden Pressure, Safe Relief—that's what BS&B Safety Heads are designed to give. There's no damage to equipment, no danger to employees. BS&B Safety Heads fail within plus or minus 5% of the pressure specifications *you* give us, whether 5 lbs., 40,000 lbs., or anywhere in between.

Tested to Destruction, BS&B Safety Heads are preproved at the factory. Rupture Discs, selected at random from each lot, are put under pressure until they fail. If each one tested does not break within 5% of the rated pressure, the entire lot is discarded!

A Full, Pipe-Sized Opening results when a BS&B Safety Head Rupture Disc blows out. You can use them for primary or secondary relief where maximum protection is needed, or to back up a relief valve when the contents might prevent the valve from functioning properly. Whether *your* pressure applications are for air, gas or liquids—bland or corrosive—you can count on BS&B Safety Heads for safe, certain relief.

Write for Complete Catalog

Whatever your pressure applications, there's a BS&B Safety Head for you. Write today for the Safety Head Catalog, or ask your BS&B Man. There's no cost or obligation for a complete analysis of your pressure safety requirements.

SAFETY BS&B HEADS OUR 50TH YEAR

BLACK, SIVALLS & BRYSON, INC.

Safety Head Division, Dept. 2-A6

7500 East 12th Street Kansas City 26, Missouri

These Facts Prove Beyond Any Doubt That Goodall Long-Life Is

A BETTER BUY

On Every Count Than Any Other Rotary Hose

1. COUPLING - The original Barney Coupling is the only coupling that is stronger than the hose itself. It is the only coupling that can be reset to save your hose from the scrap heap.
2. CORD CONSTRUCTION - Goodall's flexible cord design provides the extra strength to withstand torsional twist . . . thus eliminating the cause of more than 90% of rotary hose failures.
3. FLEXIBILITY - Goodall Long-Life can be coiled into a convenient unit for transporting without slightest damage.
4. PERFECT BALANCE - The Goodall method of winding the multiple cords of the carcass and the steel cables of the pressure element at corresponding angles assures perfect balance.
5. GREATER STRENGTH - By actual test, Goodall Long-Life is the strongest hose ever built and it retains its strength better than any other hose.
6. REPAIR SERVICE - Goodall Rubber Company is the only rotary hose manufacturer that can protect your investment with a maintenance plan. Goodall maintenance provides a repair department in Houston where any length of Long-Life that meets with an accident can be renewed for the rest of its normal life. No length of Long-Life repaired in our shop has ever failed in service.
7. SALVAGE VALUE - Substantial allowances are made on every set of Barney couplings returned.
8. NO PREMIUM PRICE - The extra quality, longlife and high salvage value of Goodall Flexible Cord costs no more than ordinary rotary hose.

If you are not fully convinced of these facts, ask anybody who makes or sells rotary hose or write to me personally. We will contact you and fill in other details and answer your questions. Thanks.

Barney

GOODALL RUBBER COMPANY
TRENTON, N. J.

GOODALL RUBBER COMPANY OF TEXAS: Houston, Odessa, Texas.
GOODALL RUBBER COMPANY OF CALIFORNIA: San Francisco, Los Angeles, Seattle, Salt Lake City.
GOODALL RUBBER COMPANY: New York, Philadelphia, Pittsburgh, Chicago, Denver, St. Paul.
EXPORT: Goodall Rubber Company, Trenton, N. J.
STOCKING DISTRIBUTORS: Texas and Louisiana—Houston Oil Field Material Co.; Wilson Supply Co.
Oklahoma—Iverson Supply Co.

Goodall Has Been FIRST With Every Worthwhile Rotary Hose Development!

DIGEST OF NEW EQUIPMENT

IT'S NEW — CHECK IT

TRADE LITERATURE

1 G. O. CARLSON, INC., STAINLESS STEELS EXCLUSIVELY, a four-page bulletin, illustrates and factually describes complete line of stainless steel plates, forgings, sheets, tank heads and flanges. Stainless steel rings and disks are shown as typical of various forms pattern-cut to shape. *G. O. Carlson, Inc.*

2 INDUSTRIAL CONTROLS. Catalog 8305 describes and illustrates nonindicating electric, electronic, and pneumatic controllers for temperature, pressure, and humidity, also pneumatic and electric valves, switches, and relays. Specifications, dimension drawings, application data and ordering information are included. *Minneapolis-Honeywell Regulator Co.*

3 CATALOG SECTION S-6820 fully describes newly designed "Karbate" brand impervious graphite sectional cascade coolers. Three standard sizes are illustrated by dimensioned engineering drawings, and their applications outlined. Catalog also contains data to aid in selection of these cascade coolers for cooling of corrosive liquids and gases, complete dimensions tables and specifications, as well as nomographs for determining cooling water requirements, over-all heat-transfer coefficients, and required cooling surface. *National Carbon Co.*

4 NONMETALLIC-DISC VALVES, an extensively illustrated multicolored circular, describes dimensions and functions of these valves, and lists in detail NMD valves which can easily be renewed or converted to handle another type of service by insertion of a specifically designed composition disk. The disks are made in three types for handling saturated steam; cold water, air and gas, and gasoline, oil, butane, and propane. *The Lunkenheimer Co.*

5 HYSTER IN THE OIL INDUSTRY is a new four-page brochure of materials-handling equipment, which illustrates typical handling operations in oil fields, bulk stations, refineries, and equipment distributors with such machines as Karry Krane, Straddle Truck, Turret Truck, and lift truck. *Hyster Co.*

6 NEW WALKER 400 BUMPER JACK. A pocket-size pamphlet describes and illustrates such features as comfortable blister-free handle, bearing-cushioned suspended screw, "counter acting" friction reducing rollers, "Adjust-O-Matic" lifting hook which automatically adjust itself to contour of deep-skirted bumpers, and extra strong U-Channel support column. *Walker Manufacturing Co.*

7 U. S. ELECTRICAL WIRES & CABLES FOR THE CHEMICAL AND PETROLEUM INDUSTRIES, a new 76-page booklet, is divided into following main sections: Insulation Compounds; Jacket Compounds; Constructions, and Technical Data. Compound sections have been expanded to include butyl, heat and moisture-resistant insulations, thermoplastic types, general-purpose neoprene, and polyvinyl chloride-type jackets. *United States Rubber Co.*

8 TWIN-BOOM PIPE-LINE DRILL. Bulletin TBD-52 describes latest rock drilling outfits for pipe-line trenching. Completely mechanized, twin-drill air-feed assemblies and drifters are suspended from crawler-tractor booms. Typical application photographs and specifications are included. *Schramm, Inc.*

FOR MORE INFORMATION . . . . use one of these cards

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, June 1, 1953

PLEASE PRINT
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NAME ..... TITLE .....

OIL AND GAS EQUIPMENT Digest NEWS CHECK IT

9 RUBBER LININGS, an illustrated, two-color, eight-page bulletin, describes advantages and application of rubber lining to steel tanks, drums, pipes, valves, fittings, and pumps. Included are tables giving resistance characteristics of MW rubber lining to inorganic acids, salts, and alkalies, organic materials, and a wide group of miscellaneous materials. *Protective Coatings Div., Metalweld, Inc.*

10 WIDCO LOGGERS, Bulletin El-19, discusses electrical logging fundamentals, and application of electric logs. It describes and illustrates shot-hole logging unit, 1,000-ft. logging units, 2,000-ft. dual logging units, 5,000-ft. dual logging equipment, and water resistivity instruments. Bulletin includes logging charts and general specifications for Widco loggers. *Well Instrument Developing Co.*

11 DIESEL ELECTRIC SETS, a 20-page booklet, with 50 illustrations, describes in detail fuel, lubrication, and cooling systems of five diesel-electric sets; contains descriptions of both self-regulated generators and completely automatic standby electric sets, and gives complete specifications on all five models. *Caterpillar Tractor Co.*

12 MODEL 3 FORCE-FEED LOADER, a two-color, eight-page bulletin, contains complete description, specifications, and pictures of this loader. Among attachments shown are an auger-feeder front end for stockpile loading, fully winterized cab for year-round work, side discharge conveyor for fast truck loading, three rear-wheel arrangements, and cleated snow belt. *Athey Products Corp.*

13 S & K PURGE ROTAMETERS WITH FLOW CONTROL AND BACK FLOW CHECK VALVE is a loose-leaf data sheet describing the use of these rotameters where small, inexpensive flow meters are needed to indicate and manually control flows of fluids with good reproducibility but moderate actual measuring accuracy. Sheet includes typical applications, specifications, and installation data. *Schutte & Koerting Co.*

14 ZEOLITE WATER SOFTENING. Bulletin WC-108 explains distinction between sodium cycle and hydrogen cycle of zeolite softening, and graphically shows differences in results obtained by the two processes. An additional section describes various types of most modern zeolite or ion-exchange materials, illustrated with photographs of actual size and also photomicrographs of typical exchangers. *Graver Water Conditioning Co.*

15 KING OF SLING ELECTRO-LINE FITTING, a four-page brochure, describes wire-rope choker sling fitting with typical applications suitable for new fitting. Brochure includes close-up views of optional locking shoe device, "how to use it" drawings, and a cutaway section showing simple socket arrangement permitting easy installation of the fitting. *Electroline Co.*

16 WARREN-QUIMBY DF TYPE PUMP. Bulletin WQ-214, illustrates and fully describes new type DF end suction, centrifugal pump, capacities up to 1,000 g.p.m. and heads to 400 ft. Features include double-row thrust bearings, extra-deep stuffing boxes, shaft sleeve with rubber sealing ring, and is adapted to pumping water, condensate, solvents, hydrocarbons, gasoline, and oils. *Warren Steam Pump Co.*

17 ROLLER CHAIN AND SPROCKETS. This 54-page book describes inherent advantages of roller chain, and illustrates all popular sizes of roller chains. A section on "how to select standard roller chain drives" is included, with formulas, tables, and examples illustrating this procedure. Dimensions, strengths, weights, and prices are also given. *Baldwin-Duckworth Div., Chain Belt Co.*

18 MODEL T-35 TRUCK CRANE, a new six-page illustrated bulletin, contains detailed mechanical specifications, together with complete dimensions and operating data, including information on various truck mountings and typical interchangeable attachments used with crane boom. Bulletin provides complete data on weights, applications, and approximate production output of eight different attachments. *Schield Bantam Co.*

FOR MORE INFORMATION . . . . use one of these cards

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, June 1, 1953

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THE OIL AND GAS JOURNAL
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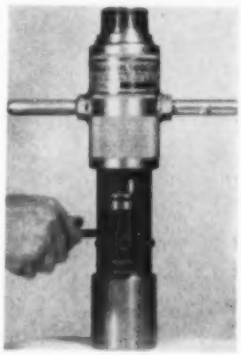
19 **THE GEO-LOGGER,** a portable electric well logger that can be operated by any driller or field hand, weighs only about 200 lb. and will easily fit into the trunk of a passenger car. A self-potential and a resistivity curve are recorded simultaneously by an instantaneous photographic process, which gives the operator a developed log as soon as plummet is withdrawn from the hole. The Geo-Log distinguishes formation characteristics clearly and accurately, and can be correlated with logs from standard truck-mounted units. Designed to stand up under any normal conditions of field use, the machine requires little or no maintenance. The reel holds 2,000 ft. of double-steel, armored, copper-conductor cable, with a breaking stress of more than 1,500 lb. Particularly useful in core-drilling operations, the equipment enables the operator to log many more holes than would otherwise be economically feasible. *Well Reconnaissance, Inc.*

IT'S NEW CHECK IT

20 **A HEAVY-DUTY CARGO TRUCK** having a huge steel deck broken only by the "island" formed by the cab in the left front corner, is designed for carrying pipe, lumber, structural steel, and other long, bulky cargo. The Murty flat-top is made with both single-axle and dual-axle drive. The single-axle type has a 25-ft. deck length with a turning wheelbase of only 14 ft. 11 in. The dual truck has a 30-ft. deck and a 17-ft. wheelbase. Pay loads are 10 tons for the single-axle and 15 tons for the dual axle. The truck has been designed to provide all-around vision for the driver; quick parking, ease in backing and handling in traffic; maximum deck area for long loads; low maintenance, and rugged frame and deck construction. The steel deck plates are mounted over a heavy wood bed, which is carried on heavy steel frame rails running the full length of the truck. The engine, a 150-hp. White, is mounted under the cab. The cab itself is 32 in. wide and 5 ft. deep. *Murty Bros.*

IT'S NEW CHECK IT

21 **EASY-ACCESS STRAIGHT-LINE CHOKE.** The Willis EZXS choke is an economical combination of a straight-line choke and a soluable plug injector. The straight line fitting is equipped with a locking sleeve that closes the access opening. The choke holder and retainer ring are easily and quickly removed at any time the operator chooses to replace the choke to inject a soluable plug to remove paraffin accumulation in the lines. The sleeve is made with a "J" slot lock and high pressures are retained by O-rings. *Willis Oil Tool Co.*



IT'S NEW CHECK IT

22 **NO. 11-OFT REGULATOR** is an improved self-operating temperature regulator built especially for control of heaters and treaters. Thermal system has overheat protection. Powerful two-ply bellows and single seat composition disk valve assures tight shutoff. Valve-stem lubricator helps give closer control and reduces packing gland troubles. It is ruggedly built for long reliable service in all kinds of weather. Operates efficiently down to 60° F. below zero. Valve sizes ¾ and 1-in. are direct acting, have single-seat bronze body with double unions for easy installation, composition disk and stainless steel seat. Temperature ad-

justment range: 110° to 190° F., other ranges between 30° to 370° F. Bulb well is cadmium-plated steel. Capillary tubing is extra-heavy indestructible type, 10 ft. long. *The Powers Regulator Co.*

IT'S NEW CHECK IT

23 TWO NEWLY DESIGNED LUBRICANT TUBES, a flat-top gun lubricant tube and a long-spouted bulk lubricant tube, are offered for simpler, more effective, and more economical lubrication of Nordstrom valves. With the flat-top tube, a lube gun can be loaded in a matter of seconds by cutting off the tube top and turning a key which squeezes the contents directly into the barrel. With the long-spouted tube, a valve lube chamber can be filled easier because the spout gets the lube further down into the valve shank than is possible with previous methods. Also, use of the spout tube simplifies inventory control, because one tube fits all Nordstrom valve sizes. The gun lubricant tubes are available in packages of six; the bulk lubricant tubes singly and in packages of four. Eight types of lubricants are available in the new tubes. *Rockwell Manufacturing Co.*

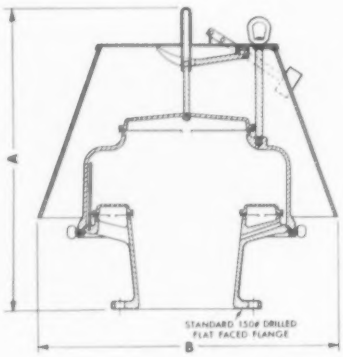
IT'S NEW CHECK IT

24 B SERIES MACKS, the new line includes both trucks and tractors in four and six-wheel types, covering a range from 17,000 lb. gross vehicle weight through 70,000 lb. gross cargo weight powered by gasoline or diesel

engines. Typical of the advantages claimed for the B Series is that of highest possible payload capacity, both of volume and weight, within legal limitations. This has been achieved through a reduction in chassis weight without any sacrifice of strength and stamina and through a new, more compact chassis design. Frames are strong and stiff but, because they are fabricated from lighter steel alloys than previously, they weigh considerably less. Axle banjos, transmission cases, and wheels all embody similar weight-reducing constructions. The B Series has a short hood, bumper, and radiator, with the engine mounted well over the front axle, thus reducing the distance from front bumper to back of cab. This design when applied to tractors permits use of maximum-length trailers within the 45-ft. overall length limit and in a truck will accommodate commensurately larger bodies. New Mack-built gasoline engines offer a complete power range for every type of hauling up to 170 hp. For truck owners whose operations lend themselves to the economic use of diesel power, two diesel engines are available as options in the 138 and 170-hp. class. *Mack Trucks, Inc.*

IT'S NEW CHECK IT

25 NEW V-130 HI-FLO VAPOR-TITE OCECO VALVE combines high flows, even at low pressures, and extremely vapor-tight membrane seating. The membranes of buna N, a synthetic composition widely and successfully used with petroleum products, are stretched across both the pressure and vacuum valve pallets. Beads around the edges of the membranes are snapped into grooves, and are held tightly in place with a noncorrosive aluminum drop ring.



An opening in the center of the pressure membrane permits tank pressures exerted against the bottom of the pressure membrane to be applied also against the top of the pressure membrane. The membrane is flexible. Consequently, the pressure exerted from the top holds the membrane tightly against the aluminum seating ring, forcing the membrane to adjust itself and conform to any unevenness or irregularity of the seating ring, assuring extremely tight leakproof closure up to the pressure at which the valve is set to open. Similarly, openings spaced around the vacuum membrane permit atmospheric pressures applied against the bottom of the vacuum membrane to be applied also against the top of the vacuum membrane, assuring tight closure up to the vacuum at which the valve is set to open. The effect is secured simply with tank and atmospheric pressures. No padding or backup material is needed or used. *The Johnston & Jennings Co.*

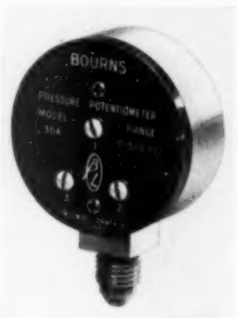
IT'S NEW CHECK IT

26 HUMDINGER SELF-PRIMING CENTRIFUGAL PUMPS. The only components inside the volute case are the impeller and the seal. This new pump excludes every other possible wearing part contributing to the hydraulic and mechanical losses. The employment of twin coaxial volute passages results in a highly efficient volute design that makes possible greater capacity, faster priming, and more trash-handling ability. The 1½-in. centrifugal pump is rated at 5,500 gal. per hour. Shaft seal and suction check valve are made of positive-sealing, oil-and-gas resistant neoprene. A new principle of adjustment compensates for impeller wear without disassembling or replacing interior parts. No shims, wear

plates, or replacement parts of any kind are required. Made in a complete range of size; 1½-in. (5,500 gal. per hour) to 10-in. (250,000 gal. per hour) the Humdinger is available with gasoline or diesel engines and electric or belt drives. Various mountings include skids, steel wheels, pneumatic tires, or trailer type. *Ralph B. Carter Co.*

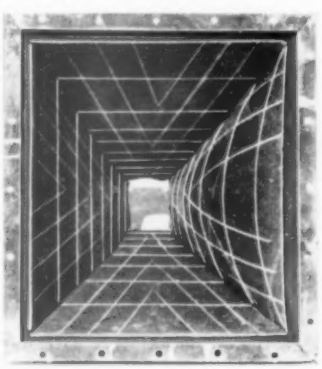
IT'S NEW CHECK IT

27 MINIATURE GAGE PRESSURE POTENTIOMETERS are designed for remote measurements of hydraulic and pneumatic pressure. Actuated by the flexure of an accurately calibrated Bourdon tube, these precision instruments have a ½-watt electrical output which is linear with applied pressure. The movement of the Bourdon tube is transmitted to the wiper contact on the wire-wound resistance element by a ball bearing-supported linkage system. Available in ranges from 0-100 to 0-5,000 psi. they have a resolution of 0.4 per cent. A wide selection of standard resistance values add to the versatility of this precision instrument. Though miniature in size and light in weight, Bourns gage pressure potentiometers are extremely rugged. Instruments are not damaged by shock, vibration or nominal overpressure. *Bourns Laboratories.*



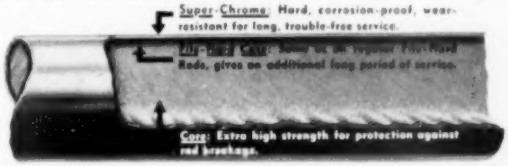
IT'S NEW CHECK IT

28 PULSATING RUBBER is an entirely new process for handling dry bulk material. On the slope sheets of hopper cars and on the turning wall of conveyor elbows and U-joints, a sheet of tough, abrasion-resisting rubber is attached, bonded around the edges only, leaving the center area free. Air is then injected behind the rubber causing it to expand and break the congestion. The pulsating action can be automatically controlled and easily set for the frequency necessary to do the job. In particularly difficult bulk-material problems, as in moving carbon black from hopper cars, a peristaltic action can be had by installing several horizontal boots, one below the other, and injecting air into them in succession from the lowest up. This action will usually move even the most stubborn material. *Abrasion & Corrosion Engineering Co.*



IT'S NEW CHECK IT

29 "SUPER-SURFACED" TO "SUPER-CHROME." The company has decided on the name changes due to the similarity of Super Surfaced and Super Service, a trade name used on other Mission products such as mud pump valves and mud pump liners. Also the name Super-Surfaced failed to indicate that the piston rod is actually chromium plated. Mission Super-Chrome rod lasts up to four times longer than ordinary rods under corrosive conditions. Pitting and grooving are reduced to a minimum and Super-Chrome rods stay smooth even when salt or brackish wash water is used. Mission has been manufacturing these rods for over 14 years, introducing them in 1939 as the first chromium plated rods for use in mud pumps. *Mission Manufacturing Co.*


Super-Chrome: Hard, corrosion-proof, wear-resistant for long, trouble-free service.
Rods, gives an additional long period of service.
Core: Extra high strength for protection against rod breakage.

IT'S NEW CHECK IT

30 SQUIER INSTRUMENT INK FEED HAS 8-DAY CAPACITY. Simple in design and inexpensive, the new Everite Instrument Ink Feed makes meter recording easy and trouble free. It is fabricated of light-weight plastic and is quickly attached with plastic bands to all makes of instrument pens. No special brackets or pen arm alterations are required. The Everite operates on the principle of capillary action. The ink feeds first upward, then down to the recording point, so sediment never clogs it. Ink flows in just the right amount only when needed. Uses regular meter ink and the reservoir holds 8 days' supply. *John P. Squier Co.*

IT'S NEW CHECK IT

31 OKLAHOMA EDITION OF THE NATIONAL OIL WELL INDEX. This index, which is expected to be a yearly publication, represents thousands of man-hours of preparation. Shipment is scheduled for June 1. Handsomely bound and convenient for ready reference, the Index contains a list of most wells in the State of Oklahoma, giving the following digest of information for each well: geographical location, section, township, range, farm name, name of company, total depth, character, date of drilling, and a handy reference number for ordering the complete well log, if desired. This information is prepared for both the East and West ranges of the state. This is the first time that this vast amount of information has been compiled for easy reference and anyone who is concerned with drillers' log records should find it a handy guide, both for information and in obtaining logs. *Copies, Inc.*

IT'S NEW CHECK IT

32 OWNER'S NAME IN THE HANDLE STOPS LOAD BINDER LOSSES. A new process puts the owner's name in the handle in raised letters. Test cases have shown large and small users reporting 50 to 100 per cent savings by thus cutting off theft and loss. Now plainly identified as the owner's property, binders are far less apt to go astray. Up to 40 letters can be used for name, city, state. *Canton Manufacturing Co.*

• Teamwork is an integral part of Houston Contracting's facilities for pipe line construction.

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J. E. LONERGAN COMPANY
Established 1872
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Pipe-Line Construction

PIPE-LINE activity as reported below by The Oil and Gas Journal is compiled from information received from pipe-line companies and contracting firms.

These projects include those planned, proposed, under way, and contracted. Uncontracted projects are indicated by a • preceding the company name.

Crude-Oil Pipe Lines

• **California - Oregon Pipe Line System**—103 miles, 6-in., proposed, Crescent City, Calif., to Medford, Oregon.

• **R. A. Goodall.**—45 miles, 6-in., planned, Little Beaver to Merino, Colo. (To connect with Sterling system).

• **Gulf Refining Co.**—55 miles, 12-in., planned, Bay Marchand to Plaquemines, La.

Humble Pipe Line Co.—71 miles, 16-18-in., under way, East Texas to Louisiana-Texas border. (30 miles of 16-in., and 41 miles of 18-in.) O. R. Burden Const. Co. Completion date 10-53.

Start 7-1, Longview to Louisiana border.

• **Interstate Oil Pipe Line Co.**—116 miles, 22-in., planned, Shreveport to Baton Rouge, La.

Interstate Oil Pipe Line Co.—55 miles, 16-in., under way, Raceland to Anchorage, La.

Under way, Raceland to Plaquemine, La. L. E. Farley, Inc. 6-15-53.

Plaquemine to Anchorage, La.

22 miles, 18-in., contracted, Louisiana-Texas state line to near Shreveport, La. River Const. Corp. 6-53.

28 miles, 22-in., contracted, Shreveport, La., to Coushatta, La. River Const. Corp. 6-53.

Lakehead Pipe Line Co.—635 miles, 30-in., under way, Superior, Wis., to Sarnia, Ontario, Canada.

Contracted, Superior to Wisconsin-Michigan state line. Mahoney Contr.

Mackinac City along Straits of Mackinac to Red Oak, Mich. Bechtel Corp.

Red Oak via Bay City to International Boundary south of Port Huron on St. Clair River. Conyes Const.

Water crossings of Mackinac, Saginaw, and St. Clair rivers. Merritt - Chapman & Scott Corp., W. J. Meagher & Sons, Inc., and Midwestern Constructors.

Under way, Michigan-Wisconsin State line through Crystal Falls to Cooks, Mich. Anderson Bros. 9-15-53.

Under way, Cooks to St. Ignace, Mich., on Straits of Mackinac. Midwestern Constructors, Inc.

• **Magnolia Pipe Line Co.**—29 miles, 8-in., planned, Midland County, Texas area.

• **Pasotex Pipe Line Co.**—146 miles, 10-in., planned, Snyder to Wink, Tex.

Phillips Pipe Line Co.—45 miles, 12-in., under way. Rancho system to Sweeny, Tex. Morrison Constructors. 6-53.

26 miles, 8-in., under way, northeast area of Andrews County, Texas.

18 miles, under way, gathering lines, northeast area of Andrews County, Texas.

Platte Pipe Line Co.—93 miles, 12-14-in., under way. Chatham station near Worland, Wyo., to Oregon basin, and Byron field. R. H. Fulton Co. Completion date 6-53.

Under way Chatham, Wyo., to Oregon basin. R. H. Fulton Co.

Under way Oregon basin to Byron-Garland field. R. H. Fulton Co.

• **Progress Pacific Pipeline Co.**—1,100 miles, 24-in., planned, Odessa, Tex., to Los Angeles Harbor, Calif.

• **Roosevelt Oil & Refining Corp.**—22 miles, 4 and 6-in., planned St. Helens to Norwich, Mich.

• **Service Pipe Line Co.**—185 miles, 16-in., planned, Bowie, Tex., to Drumright, Okla.

29 miles, 4-6-8-in., proposed, Natrona County, Wyoming.

170 miles, 12-16-in., proposed, Tioga-Beaver Lodge to Williston, N. D.

16-in., Tioga-Beaver Lodge area to Mandan, N. D.

12-in., Mandan to Williston, N. D.

41 miles, 4-6-8-in., planned, Williams and Mountrail counties, North Dakota.

Texas Pipe Line Co.—34 miles, 6-in., under way, Sour Lake to Port Arthur, Tex. Houston Contracting.

45 miles, 8-10-in., under way, between Erath and Bayou Sale stations. Houston Contracting Co.

• **West Coast Pipeline Co.**—960 miles, 20-22-in., planned, Wink, Tex., to Norwalk, Calif.

Products Pipe Lines

H. W. Bass & Sons., Inc.—152 miles, 4-6-in., proposed, Duval and Live Oak counties, Texas, to Corpus Christi, Tex.

Buckeye Pipe Line Co.—370 miles, 10-14-16-in., under way, Linden, N. J., via Allentown, Pa., to Auburn, Syracuse, Waterloo, and Rochester, N. Y. 9-53.

Guthsville to Dupont, Pa. Pipe Line Const. & Drilling Co.

Dupont north to Pennsylvania-New York state line. Fulghum Contr. Corp.

Pennsylvania-New York state line to Auburn, N. Y. Williams-Austin.

Auburn to Syracuse, N. Y. Williams-Austin.

Auburn to Caledonia, N. Y. Universal Map and Survey Co.

• **Continental Pipe Line Co.**—(Yellowstone Line)—600 miles, 8-in., planned, Billings, Mont., to Spokane, Wash.

Harbor Products Systems—36 miles, 16-in., under way, Woodbury Junction, Philadelphia to Trembley Point, N. J. (Joint ownership of Sinclair Pipe Line Co., Gulf Refining Co., and Texas Pipe Line Co.

Indiana Farm Bureau Cooperative Association, Inc.—180 miles, 8-in., under way, Mt. Vernon to Indianapolis, Ind. R. B. Potashnick, contractor.

70 miles, 4-in., under way, Indianapolis to Peru, Ind. R. B. Potashnick, contractor.

Inland Empire Pipe Line Co.—504 miles, 10-in., proposed, Billings, Mont., to Spokane, Wash.

• **Kaneb Pipe Line Co.**—236 miles, 8-in., planned, Wichita and Potwin, Kans., to Fairmont, Neb. 9-53.

• **Phillips Petroleum Co.**—54 miles, 6-in., planned, Goldsmith to Borger, Tex.

52 miles, 10-in., planned, Shell's Brookshire system to Sweeny, Tex. 5-53.

Phillips Pipe Line Co.—33 miles, 12-in., Texas and Oklahoma loops. R. H. Fulton & Co. 6-53.

30 miles, 12-in., Kansas loops. 6-53.

Plantation Pipe Line Co.—82 miles, 14-in., contracted, Charlotte to Greensboro, N. C. Anderson Bros.

Salt Lake Pipe Line Co.—140 miles, 8-in., start 6-1. Pasco to Spokane, Wash. Morrison-Knudson Contr. Completion date 10-1-53.

• **Standard Oil Co. (Ind.)**—Planned, Mandan, N. D., to Moorhead, Minn.

Standard Oil Co. (Ind.)—243 miles, 10-12-in., under way, Whiting, Ind., to River Rouge, Mich.

Porter, Ind., to Colon, Mich. Somerville Const. 9-1-53.

Sun Pipe Line Co.—50 miles, 8-in., under way, Toledo, Ohio to Inkster Junction west of Detroit. 10-53. R. L. Coolsaet Const. Co. and Poston Pipe Line Co.

Texas Pipe Line Co. (Evangeline Products Systems)—196 miles, 16-in., under way, Port Arthur, Tex., to Baton Rouge, La. Panama-Williams Co. Completion date 7-53.

• **United States Pipe Line Co.**—1,799 miles, 22-26-in., proposed, Beaumont, Tex., to Newark, N. J.

Beaumont, Tex., to Memphis, Tenn.
Memphis, Tenn., to Louisville, Ky.
Louisville, Ky., to Newark, N. J.
Laterals to Paducah and Lexington, Ky.

• **Williston Basin Pipe Line Co.**—244 miles, 8-in., proposed, Laurel-Billings, Mont., refineries to Glendive, Mont.

• **Wolverine Pipe Line System**—200 miles, 14-in., planned, Chicago to Toledo and Detroit. (Joint ownership of Shell, Texas, and Cities Service). Completion date 1-54.

Natural-Gas Pipe Lines

• **Allied Gas Co.**—24 miles, 6⅝-in., proposed, McLean to Champaign County, Illinois.

• **Arkansas-Missouri Power Co.**—140 miles, 2 to 10-in., planned, St. Francis River, Clay County, Arkansas, to near Campbell, Mo.

• **Associated Natural Gas Co.**—88 miles, Missouri.

• **Atlantic Seaboard Corp.**—29 miles, 26-in., proposed, looping along Cobb-Rockville line.

• **Carolina Natural Gas Corp.**—185 miles, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

• **Chattahoochee Natural Gas Co.**—70 miles, proposed, Floyd County, Georgia, to Dalton, Ga.

• **Chicago District Pipe Line Co.**—35 miles, 24-30-in., proposed, Chicago area.

• **Cities Service Gas Co.**—18 miles, 16-in., Lawrence and Newton counties, Missouri.

69 miles, 20-16-in., proposed, Cleveland, McClain, and Garvin counties, Oklahoma.

• **Coast Counties Gas & Electric Co.**—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

• **Colorado Interstate Gas Co.**—365 miles, 22-in., proposed, Green River, Wyo., to Denver, Colo. 1954.

116 miles, proposed, Colorado, Oklahoma, Texas, and Kansas. 1953.

• **Cumberland and Allegheny Gas Co.**—31 miles, 12-in., proposed, Garrett County, Md., to Keyser, W. Va.

• **East Tennessee Natural Gas Co.**—158 miles, 16-in., start July, Knoxville to Kingsport, Tenn. (58 miles of laterals.) 11-53.

• **El Paso Natural Gas Co.**—1,778 miles, proposed, Permian basin, New Mexico, Texas, and Colorado.

• **Fort Worth Basin Gas Co.**—Planned, Novice, through Brown and Comanche counties, Texas.

• **Glacier Gas Co.**—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

120 miles, 16-in., proposed, Spokane to Hanford, Wash.

91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

Gulf Interstate Gas Co.—860 miles, 30-in., contracted, Acadia Parish, La., to Boyd County, Ky. H. C. Price and Houston Contracting.

230 miles, gathering lines, contracted, Associated Pipe Line Contractors, Anderson Bros., Williams Bros.

329 miles, 12 to 24-in., proposed. Laterals off Acadia Parish, Louisiana, to Boyd County, Kentucky, line.

• **Home Gas Co.**—32 miles, 12-in., planned, Bressport to Union Center, N. Y.

17 miles, 12-in., proposed, loops from Hansock to Sanford, N. M.

46 miles, 12-in., under way, Tioga and Broome counties, New York. H. L. Gentry Const.

22 miles, 12-16-in., under way, Binghampton, N. Y.

• **Interstate Power Co.**—26 miles, 8-in., proposed, from Nat. Gas P. L. Co. America line near Hooppole, Ill., to Clinton, Ia.

Iowa-Illinois Gas & Electric Co.—41 miles, 10-in., start last half '53, Washington County to Cedar Rapids, Iowa.

• **Kansas-Nebraska Natural Gas Co., Inc.**—179 miles, planned, Kansas and Nebraska.

54 miles, 4-6-in., planned, Neligh to Hartington, Neb. Completion date 1953.

42 miles, 4-6-in., planned, Neligh to O'Neil, Neb. 9-53.

196 miles, planned, to serve Wisner, Pilger, and Stanton, Neb.

Kansas Nebraska Natural Gas Co.—70 miles, 6-8-in., under way, Nebraska City to Denver-Julesburg basin, Colo.

• **Lone Star Gas Co.**—100 miles, proposed, storage fields to the Dallas-Fort Worth area.

35 miles, 12-in., proposed, southeastern Schleicher County.

• **Manufacturers Gas Light & Heat Co.**—40 miles, proposed, Allegheny, Washington, and Beaver counties, Pennsylvania.

213 miles, 3 to 26-in., proposed, various points on system in Pennsylvania, West Virginia, and Ohio.

Michigan Gas Storage Co.—30 miles 26-in., under way, Lainsburg Junction north. Mahoney Contracting. 7-1-53.

• **Mississippi River Fuel Corp.**—109 miles,

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10-18-in., planned, laterals in Woodlawn and Waskom gas fields, Texas.

Missouri Central Gas Co.—25 miles, 6-in., contracted, Moberly to Macon, Mo. L. R. Young Const. Co.

• **Missouri Public Service Co.**—136 miles, 8-10-in., proposed, New Franklin to Trenton, Mo.

24 miles, 10-in., Johnson County to Clinton, Mo.

• **Montana Power Co.**—52 miles, 16-in., planned, Canada - Montana border to Cut Bank, Mont.

• **Morganfield Natural Gas Co.**—31 miles, 4-6-in., planned, through Sturgis, Providence, Clay, Diamond, Wheatcroft, and Sullivan, Ky.

• **Natural Gas Producers Inc.**—100 miles, 12-in., planned, Yenter pool to Denver, Colo.

• **Nevada Natural Gas Pipe Line Co.**—114 miles, 12¾-in., proposed, Topock, Ariz., to Las Vegas, Nev.

• **New River Gas Co.**—50 miles, planned, Summers to Monroe counties, West Virginia, to Narrows and Dublin, W. Va.

• **New York State Electric and Gas Co.**—59 miles, 8-10-24-in., proposed, Oneonta and Norwich to DeRuyter, N. Y.

New York State Natural Gas Corp.—104 miles, 14, 16, 20-in., under way, looping on Westmoreland, Armstrong, and Tioga counties, Pennsylvania. (Includes 17 miles, 16-in., in Potter County, Pennsylvania, and 21 miles 14-in., replacement in Line No. 507, New York.)

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• **New York State Natural Gas Co.**—75 miles, 20-in., proposed, Cameron County to Armstrong County, Pennsylvania.

58 miles, 14 and 20-in., planned, New York State line.

Sabinsville to Boom station.

Skaneateles to Onondaga, N. Y.

Ithaca to Dryden, N. Y.

Niagara Mohawk Power Corp.—55 miles, 10-in., under way. Watertown to Syracuse, New York. Williams-Austin Co. 8-1-53.

• **Northern Indiana Fuel & Light Co.**—33 miles, 8-in., proposed, Edgerton to Auburn, Ind.

• **Northern Natural Gas Co.**—580 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska loops.

Northern Natural Gas Co.—Section No. 1, 92 miles, 30-in., under way, Dumas via Sunray to main line north of Canadian River, Texas, and two loops near Beaver station, Oklahoma, R. H. Fulton & Co.

Northern Natural Gas Co.—Section 2, 70 miles, 30-in., contracted, loops near Mullinville, Bushton and Clifton stations, Kans., and Palmyra station, Neb. Lone Star Constructors.

Northern Natural Gas Co.—Section 3, 94 miles, 24-in. and 30-in., contracted loops near Paulina, Ogden, and Oakland stations, Iowa, G. G. Griffis Construction Co.

Northern Natural Gas Co.—140 miles, 4-6-8-in., under way, south of Rolla, Kans., to Guymon, Okla. Reese Bros. Const. Co.

• **Northwest Natural Gas Co.**—750 miles, planned, Washington, Oregon, and Idaho.

24-in., Eastport, Idaho, to Monroe, Wash.

18-in., Monroe to International boundary near Lynden, Wash.

22-in., Monroe to near Seattle, Wash.

20-in., Seattle to Portland, Ore.

• **Ohio Fuel Gas Co.**—31 miles, 20-in., planned, Licking County to Richland County, Ohio.

22 miles, 16-in., planned, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., planned, Wellington to Elyria, Ohio; 16 miles, 20-in., planned, Benton Station to Crawford Station; 18 miles, 20-in., Crawford Station to near Columbus; 16 miles, 16-in., planned, Berlin to Sandusky, Ohio.

74 miles, 3 to 20-in., planned, Hocking, Knox, and Ashland counties, Ohio.

47 miles, 20-in., planned, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, planned, northern and southwestern Ohio.

33 miles, 20-in., proposed, Jefferson to Seneca, Ohio.

Oklahoma Natural Gas Co.—50 miles, 18-in., under way, Sapulpa to Chouteau, Okla. Engineering Const. Co. 6-53.

Pacific Gas & Electric Co.—50 miles, 12-16-20-in., planned, Fresno to Merced, Calif.

(Section 2) 20-in., Holm to Topock-Milpitas line.

(Section 3) 12-in., parallel existing Madera-Livingston line, planned. Napa Wye to Shellville; Cotati to Santa Rosa, Calif.

170 miles, 34-in., proposed, main-line loops along Topock, Ariz., to Milpitas, Calif.

Pacific Gas & Electric Co.—86 miles, 34-in., under way, parallel sections along Topock-Milpitas line. Engineers Pipe Line, Ltd. Summer 1953.

• **Pacific Northwest Pipeline Corp.**—1,466 miles, proposed, Ignacio, Colo., to Bellingham, Wash.

380 miles, proposed, laterals and spurs off main line to Pocatello, Idaho, to Yakima, Wash.

• **Peoples Natural Gas Co.**—25 miles 6 to 24-in., planned, Cambria and Blair counties, Pennsylvania.

• **Permian Basin Pipeline Co. (Northern Natural)**—280 miles, 16-24-26-30-in., under way, West Texas and New Mexico. R. H. Fulton & Co.

• **Phillips Petroleum Co.**—125 miles, 2 to 24-in., under way, Midland, Upton, Glasscock, and Reagan counties, Texas. Vaughn & Taylor Const. Co. Completion date 6-53.

28 miles, 10-in., under way, Bayou Plant to Adams Terminal. Massey Const. Co. Completion date 7-53.

• **Public Service Co. of Colorado**—95 miles, proposed, Douglas Creek and other gas fields to Grand Junction, Colo., area.

• **Rockland Light & Power Co.**—22 miles, 8-in., proposed, Orangetown to Tompkins Cove, N. Y.

• **Shenandoah Gas Co.**—39 miles, 3-4-8-in., proposed, Middleton, Va., to Martinsburg, W. Va.

• **South Carolina Natural Gas Co.**—160 miles, 16-12-10-in., proposed, Aiken, S. C., to cities of Columbia, Summerville, and Charleston, S. C.

• **South Georgia Natural Gas Co.**—339 miles, 2-12-in., planned, Phoenix, Ala., to Tallahassee, Fla. (a) 12-in., Phoenix, Ala., to Albany, Ga., (b) 10-in., Albany, Ga., to Moultrie, Ga., (c) 8-in., Moultrie, Ga., to Tallahassee.

• **Southern California Gas Co., and Southern Counties Gas Co.**—73 miles, 30-in., planned, loops on main line from Blythe to Los Angeles.

Southern Natural Gas Co.—1,235 miles, 24 to 4½-in., under way, Louisiana, Mississippi, Alabama, and Georgia, and South Carolina. Houston Contracting and H. C. Price. Fall 1953.

Gwinville, Miss., to Franklinton Junction, La. Houston Contr. 7-53.

Lateral from Franklinton Junction, La., to Sand Hook field, Mississippi. Houston Contracting.

Franklinton Junction, La., to Duck Lake gas field, Louisiana. Houston Contracting.

Duck Lake gas field, Louisiana, to Lake Sand field, Louisiana. Houston Contr.

• **Southern Union Gas Co.**—21 miles, 20-in., planned, Albuquerque, N. M.

30 miles, 12-20-in., contracted, San Juan County, New Mexico. R. H. Fulton & Co.

• **Southwest Gas Corp., Ltd.**—26 miles, proposed, from P.G.&E. line to Victorville, Calif.

• **Tennessee Gas Transmission Co.**—574 miles, 30-in., proposed, Kinder, La., northeast through Louisiana, Mississippi, to Portland, Tenn.

130 miles, proposed, looping in Texas and Louisiana. Including 67 miles of 30-in. line.

63 miles, 26-in., proposed, loop near Greenup, Ky., and Mercer, Pa.

45 miles, 20-in., proposed, Buffalo, N. Y., to the U. S.-Canadian border Hamburg station near St. Catherines.

Tennessee Gas Transmission Co.—Start June 1, 20 miles, 30-in., Natchitoches, La., to Goldonna, La. Oklahoma Contracting Co.

18 miles, 30-in., under way Middletown to Selmer, Tenn. Oklahoma Contracting Co.

47 miles, under way, Springfield, Tenn., to near Bowling Green, Ky. Anderson Bros. 6-15-53.

35 miles, contracted, Campbellsville, Ky., to Danville, Ky. Western Pipe Line Constructors.

21 miles, 26-in., under way, Carter, Ky., to Ohio River. Western Pipe Line Constructors.

70 miles, 24-in., under way, Mercer, Pa., to Pigeon, near Coudersport, Pa. H. C. Price Co.

60 miles, 24-in., under way, Pigeon, Pa., to Hebron field, Porter County, Pennsylvania. Bechtel Corp.

Texas Eastern Transmission Corp.—315 miles, 24-in., under way, Provident City, Tex., to Castor, La. Brown & Root, Inc. 6-20-53.

Constracted, Lavaca County to Waller County, Texas. Associated Pipe Line Contractors, Inc.

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Contracted, River crossings of Trinity, Brazos, Colorado, and Saline rivers. Pentzien, Inc.

• **Texas-Ohio Gas Co.**—1,435 miles, 30-in., proposed, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va. Completion date 6-30-53.

• **Trans-Northwest Gas, Inc.**—246 miles, proposed, International Boundary near Osoyoos, B. C., to Washington and Idaho.

275 miles, branch lines.

• **Union Oil Co. of California**—40 miles, 8-10-in., planned, San Joaquin Valley and Los Angeles Basin.

• **United Fuel Gas Co.**—50 miles, 20-24-in., proposed, Wood County to Lanham, W. Va. Spring 1954.

32 miles, 24-in., proposed, near Ripley, W. Va., to Lanham station, Putnam County, W. Va.

• **United Gas Pipe Line Co.**—44 miles, 20-in., planned, Lirette field to Harvey, La.

• **United Natural Gas Co.**—50 miles, 12-in., planned, Elk County to Jefferson County, Pennsylvania.

• **Utah Natural Gas Co.**—103 miles, 16-18-in., proposed, Clear Creek field near Price to Salt Lake City, Utah.

18-in., Clear Creek to Provo, Utah.

16-in., Provo to Salt Lake City, Utah.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Warren Petroleum Corp.—78 miles, 2-24-in., proposed, Lovington, N. M. Completion date 9-53.

Westcoast Transmission Co., Ltd.—(See foreign natural gas pipe lines).

• **Western Slope Gas Co.**—34 miles, 8-in., start June, Garmesa to West Douglas Creek, Colo. 8-53.

Wilcox Trend Pipe Line Co. (Harry Bass Drlg. Co.)—157 miles, 14-16-20-in., under way, gathering system for delivery to proposed Texas Eastern terminal at Provident City, Tex. H. B. Zachry. Completion date 5-53.

Under way, Lavaca County to DeWitt County, Texas, and Duval County to DeWitt County, Texas. H. B. Zachry. 5-53.

Under way, laterals and gathering lines. Altgelt Const. Co.

Foreign Crude-Oil Pipe Lines

Basrah Petroleum Co.—72 miles, 24-in., under way, Zubair to Fao, Iraq. Completion date May 1953.

• **Cia. de Petroleo Ganso Azul, Ltd.**—48 miles, 4-in., planned, Ganzo Azul field to Pucalpa on upper Ucayali River, Peru.

• **Creole Petroleum Corp.**—25 miles, 34-in., planned, Lagunillas to La Salina (State of Zulia, Venezuela.)

Direccion General de Yacimientos Petroliferos Fiscales—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

Gaz de France, 200 miles, 12-in., Ruhr to Paris, France.

Interprovincial Pipe Line Co.—135 miles, 24-in., under way, looping from Regina to U. S. border, Canada. Anderson International Contrs., Ltd. 8-53.

• **National Iranian Oil Co.**—38 miles, 12-in., planned, Lali to Masjid-i-Sulaiman, Iran.

27 miles, 12-in., planned, Kut-Abdullah to Zergan, Iran.

• **Petroleos Mexicanos.**—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

72 miles, 12-in., proposed, Poza Rica to Atzacapotzalco, Mexico.

Petroleos Mexicanos.—125 miles, 10-in., under way, Jose Colomo to El Plan, Mexico.

• **Saskatoon Pipe Line, Ltd.**—56 miles, 6-in., planned, Milden to Saskatoon, Sask.

Texas Petroleum Co.—60 miles, 4-6-in., under way, Pta. Nino to La Dorada.

• **Trans Mountain Oil Pipe Line Co.**—30 miles, planned, Vancouver, B. C., terminal to Ferndale, Wash.

Trans Mountain Oil Pipeline Co.—711 miles, 24-in., under way, Edmonton, Alta., to Vancouver, B. C. Canadian Bechtel, Ltd., engineers. Completion date 8-53.

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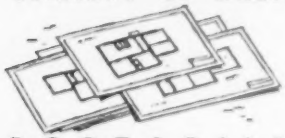

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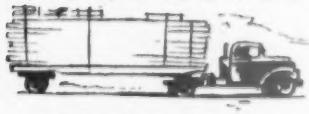

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Edmonton to Acheson, Canadian Pipe Line Const. 8-53.

Jasper to Blue River, B. C., Comstock Midwestern. 8-53.

Blue River, B. C., to Coquehalla, B. C., Mannix, Ltd. 8-53.

Chilliwack to Coquehalla, B. C. Comstock Midwestern. 8-53.

Sumas to Vancouver, B. C., Comstock Midwestern 9-53.

• **Yacimientos Petroliferos Fiscales Bolivianos.**—170 miles, 4-in., planned, Bermejo to Tupiza, Bolivia.

Foreign Products Pipe Lines

Colombian Ministry of Petroleum. — 115 miles, 4-in., begin 1953, La Dorada to Cartago, Colombia, Williams Bros. Engineers.

93 miles, 8-in., begin 1953, Cantimplora to Dorada, Colombia, William Bros. Constructors.

• **Empresa Nacional del Petroleo** — 80 miles, 6⅝-in., planned, Concon to Santiago, Chile.

Empresa de Ferrocarriles Ecuatorianos.—50 miles, 6-in., contracted, Guayaquil to Palmira, Ecuador. J. A. Jones, contractor; C.R.C. Engineering Co., engineers.

• **Governments of Southern Rhodesia and Portuguese East Africa.**—200 miles, considered, Beria, Portuguese Mozambique to Umtalia, Southern Rhodesia.

• **Petroleos Mexicanos.**—124 miles, 6-in., planned, Lagos to Guadalajara, Mexico.

54 miles, 6-in., planned, Lagos to Aguascalientes, Mexico.

82 miles, 8-in., planned, Salamanca to Lagos, Mexico.

• **Shell Co. of Australia.**—58 miles, 8-in., planned, Geelong, Melbourne to Newport, Australia.

• **Sun Pipe Line Co. of Canada.**—200 miles, 8-in., planned, Sarnia, Hamilton, Toronto, Ont.

• **United States Government.**—375 miles, 12-in., planned, St. Nazaire to Melun and Metz, France.

Foreign Natural-Gas Pipe Lines

• **Azienda Generale Italiana Petroli.**—110 miles, 12-14-16-in., Start 11-52. Cortemaggiore to Genoa. Completion date 11-53.

Azienda Generale Italiana Petroli — 90 miles, 12-in., under way, Cortemaggiore to Bologna, Italy, SNAM crews.

120 miles, 16-in., under way, Cremona Porto Mar to Ghera, Italy, Montubi, contractor.

40 miles, 12-in., under way, Ripalta-Bergamo, Italy.

Direccion General del Gas del Estado—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

• **Empresa Nacional del Petroleo**—80 miles, 10-in., planned, Concon to Santiago, Chile.

• **Mid-Continent Pipelines, Ltd.**—1,860 miles, 30-in., proposed, Alberta to Montreal, Canada. Fish Engineering Co.

• **Northwest Natural Gas Co.**—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

Petroleos Mexicanos.—205 miles, 16-in., under way, Monterrey to Torreon, Mexico.

• **Petroleos Mexicanos.**—440 miles, 20-in., planned, Brazil to Tampico to Poza Rica, Mexico.

• **Trans-Canada Pipe Lines, Ltd. (Canadian Delhi Oil Co.)**—2,247 miles, 14 to 30-in., proposed, Alberta to Toronto to Montreal.

747 miles, 8 to 24-in., gathering system in Alberta.

• **Westcoast Transmission Co., Ltd.**—1,110 miles, 24-in., planned, Dawson Creek, B. C., through Pine Pass and Fraser River Valley to Kamloops, Princeton, and Vancouver to Portland. Ford, Bacon & Davis, engineers.

280 miles, 20-in., planned, Pincher Creek to Montana on to Spokane, Wash. Ford, Bacon & Davis, engineers.

138 miles, 20-in., planned, Sumas to Tacoma, Wash.

139 miles, 18-in., planned, Tacoma, Wash., to Portland, Ore.

• **Western Pipe Lines.**—833 miles, 24-in., proposed, from southern Alberta, eastward across the Canadian prairies, serving principal towns and cities along the route.

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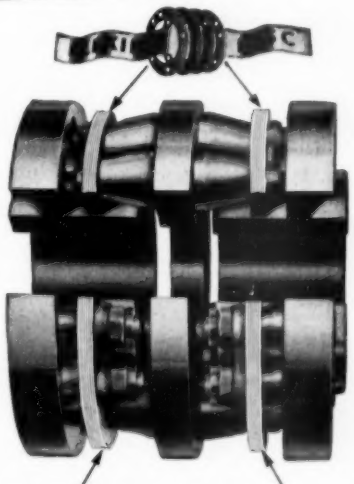

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NATURAL GAS

Top Texas Court Asked to Rehear Gathering-Tax Case

AUSTIN.—Attorneys for Panhandle Eastern Pipe Line Co., Michigan-Wisconsin Pipe Line Co., and Amarillo Oil Co. have asked the Texas Supreme Court to reconsider its decision upholding the natural-gas gathering tax.

About $15,000,000 in taxes paid under protest is now tied up in the Texas treasury awaiting a final decision in the courts. If the state Supreme Court refuses to rehear the case or reaffirm its decision upholding the tax, the case is expected to be taken soon to the United States Supreme Court.

The motion for rehearing was based on a plea that the appellate courts which ruled against the companies erred in failing to rule that the tax violates the interstate-commerce clause of the federal Constitution. In the first trial, in District Court in Austin, the court ruled the tax to be unconstitutional. This ruling was reversed by a court of appeals, which was upheld by the state Supreme Court.

Kansas Adopts 14.65 Psi. For Well-Head Measurement

TOPEKA, Kans.—A new method of measuring well-head gas which will result in a 10 per cent increase in the state's minimum price has been approved by the Kansas Corporation Commission.

Beginning July 1, gas will be measured on a pressure basis of 14.65 psi. The pressure at which gas now is measured is 16.4 psi. The difference in pressure will mean a greater volume measurement for the same amount of gas and will, without a price change, result in a higher cost to the buyer.

The change had been requested by southwestern Kansas royalty owners, who also asked for a price hike from a minimum of 8 cents to a minimum of 12 cents. Opposing the change in pressure base were major pipe-line companies, industrial users, and more than 109 municipalities.

Commission Reports on January Gas Production

AUSTIN, Tex.—Total reported gas production in Texas for January was 472,913,169 M.c.f., the Texas Railroad Commission has reported.

The volume taken by transmission lines was 309,874,255 M.c.f., or 65.52 per cent of the total gas produced. Approximately 40.55 per cent of the total was exported from the state.

Other January production figures include: extraction loss - plants, 15,056,045 M.c.f.; plant fuel and lease use, 36,026,655 M.c.f.; pressure maintenance and repressuring, 23,351,578 M.c.f.; cycling, 39,605,520 M.c.f.; carbon black, 18,111,604 M.c.f.; vented, 30,635,470 M.c.f., and plant-meter difference, 252,042 M.c.f.

FPC's New Gas Rate Ruling Goes Into Effect July 1

WASHINGTON.—The Federal Power Commission has adopted a new ruling governing filing of rate increases by natural-gas companies.

The new ruling, which goes into effect July 1, will provide for more complete support of applications than under the present rule. It will permit natural-gas companies to present cost data reflecting known changes effective within 7 months of the last month of available actual experience.

The proposed rule change was announced last October, and an oral argument was heard December 18.

Further Gains by Natural Gas in New York Expected

NEW YORK.—When current gas-line construction projects are completed, an estimated 90 per cent of upstate New Yorkers now using manufactured gas will convert to natural gas, according to a study made by the New York State Department of Commerce.

Use of natural gas in the state has greatly increased since 1940, when total consumption was about 150,000,000 therms. By comparison, total sales in 1951 exceeded 500,000,000 therms.

Principal metropolitan areas not now served by natural gas are Buffalo, Rochester, parts of Long Island, and parts of New York City.

NATURAL GASOLINE

Spraberry Plant of El Paso Natural Begins Operations

MIDLAND.—The Midkiff gasoline plant of El Paso Natural Gas Co. in Northwest Reagan County, Texas, has gone into partial operation, receiving gas from 63 Spraberry wells.

When completed the plant will have a capacity of about 100,000,000 cu. ft. of gas daily. It is expected that gas from 25 wells of Tide Water Associated Oil Co. will be handled by the plant as soon as a gathering system in that area is completed.

Four compressor units capable of handling 35,000,000 cu. ft. of gas daily already have been completed in the El Paso Natural plant.

Increase Shown in March Natural-Gasoline Output

Total production at natural-gasoline and cycling plants averaged 651,700 bbl. daily in March for an increase of 48,200 bbl. daily or 8.0 per cent over March 1952.

The high level of production in March resulted in an average for the first quarter of 658,100 bbl. daily. This average represented a gain of 45,000 bbl. daily or 7.3 per cent over the first quarter of 1952. The relatively large percentage gain for production of light products indicates a continuation of the trend that has existed since the end of the war in which the percentage gains for light products have been much larger than the percentage increases in crude production. Crude production for the first quarter was up 3.6 per cent over the same quarter last year.

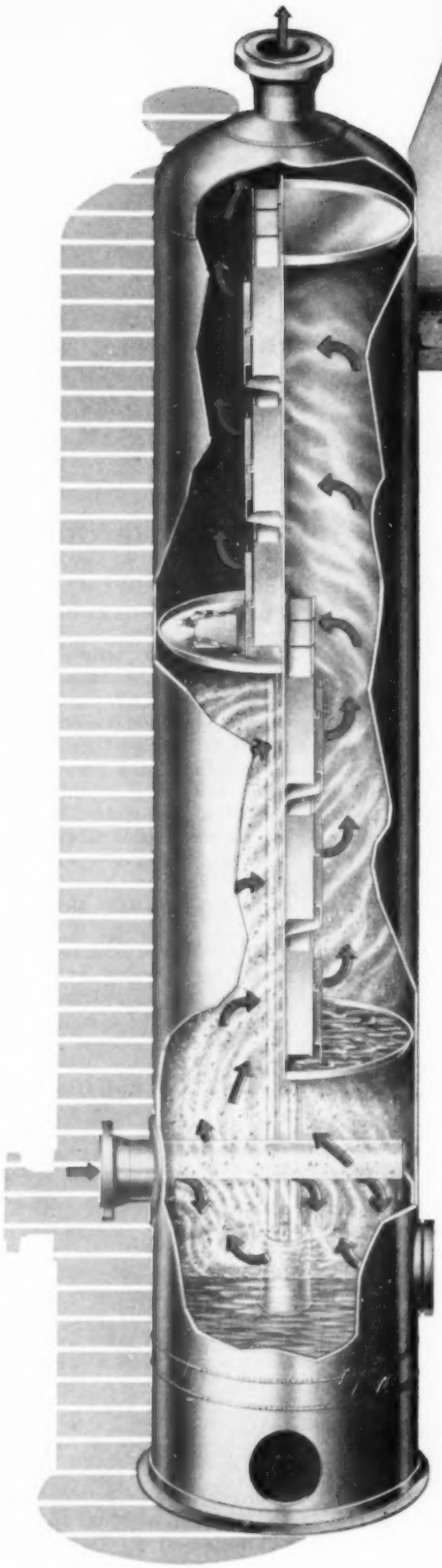
Plant production of L.P.G. averaged 318,700 bbl. daily for the January-March period, up 10 per cent over last year. Natural-gasoline from plants increased 4.6 per cent over the first quarter of 1952 to average 240,100 bbl. daily. L.P.G. represented 48.4 per cent of total plant production in the first 3 months of this year.

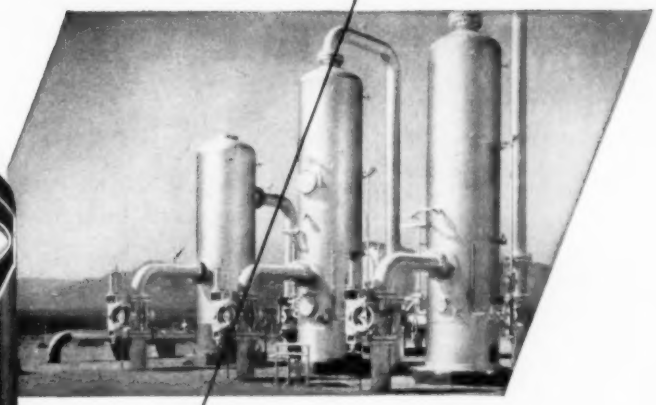
Cycling Plant Planned

SWEETWATER, Tex.—The city of Sweetwater has agreed to lease land adjacent to the airport to Rowan & Hope as a site for a proposed cycling plant to serve Rowan & Hope oil field.

Plans for the plant, which would process between 3,000,000 and 5,000,000 cu. ft. daily, were outlined before the commission by Alvin Hope.

The plant would extract liquid hydrocarbons and return the residue gas to the producing formation.





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Fluor liquid removal Gas Cleaners come in two models: WL (single pass), and WLL (double pass) for higher liquid loads. To determine the correct size of a gas cleaner, Fluor engineers use these variables: (1) Operating pressure. (2) Operating temperature. (3) Throughput of gas. (4) Gas density. (5) Liquid density. In addition, Fluor takes into account *the quantity of liquid entrained in the gas!* Thus Fluor Gas Cleaners meet or exceed their guarantee not only at a specific point but through the whole range of operating conditions.

FLUOR SOLID REMOVAL GAS CLEANERS — For removing dust from gas lines Fluor Model DV Gas Cleaner features a Venturi spray chamber which aspirates oil in proportion to gas flow rate. All dust particles are thoroughly wetted and dropped out during passage through the expansion areas and mist extraction elements. The liquid removal portion of the scrubber is similar to the WLL unit (illustrated here) with two elements and three dropout areas.

For full details on Fluor Gas Cleaners, write for Bulletin GC-0.001

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PIPE LINES

Financing Planned

$34,000,000 stock issue slated by Gulf Interstate

NEW YORK.—Gulf Interstate Gas Co., whose 860-mile, 30-in. natural-gas transmission line and more than 300 miles of gathering lines have just been approved by the Federal Power Commission *(The Oil and Gas Journal, May 25, page 274)*, is expected to announce plans in the immediate future for selling $34,000,000 of preferred and common stock to help pay for its $130,000,000 line.

The company has already made arrangements to distribute $96,000,000 in 4⅛ per cent first-mortgage bonds to a block of insurance companies headed by Metropolitan Life Insurance Co.

According to reports, Panhandle Eastern Pipe Line Co. will get first crack at the new issue of common. Gulf Interstate was organized by Panhandle officials, and preliminary engineering work for the big line was handled by a Panhandle subsidiary, Trunkline Gas Co.

The Gulf Interstate line will extend from Rayne, La., in Acadia Parish, to Boyd County, Kentucky, near Huntington, W. Va. It is the first major transmission line to carry natural gas on a fee basis. The gas will be transported for the account of United Fuel Gas Co., Charleston, W. Va., an affiliate of Columbia Gas System. Fed into United's system near Huntington, the gas will be part of the pooled supply of Columbia Gas System.

To receive the gas delivered by Gulf Interstate, more than $28,000,000 in facilities must be provided by United Fuel and other Columbia affiliates.

Capacity . . . Gulf Interstate plans an initial capacity of 375,000,000 cu. ft. of gas daily, and design is such that this could be increased to 565,000,000 cu. ft. daily by adding five compressor stations and increasing horsepower in the presently approved five stations.

FPC conditioned the certificate, however, to require that the company move not more than 109,500,000,000 cu. ft. of gas annually through the line, an average of about 300,000,00 cu. ft. daily. The commission said evidence presented by the company showed its gas supply to be sufficient to supply no more than that amount.

The company is to file financing plans within 30 days of issuance of the certificate and tariff schedules within 60 days.

Chairman Nelson Lee Smith of the commission agreed with the result of the commission findings only, and Commissioners Dale E. Doty and Thomas C. Buchanan filed separate concurring statements.

Buchanan, in a statement filed May 15, the day he left the commission, said Columbia is getting what may be "the highest" cost Southwest gas, 38-48 cents per M.c.f. delivered, while it could fight for and get delivered gas for 31.9 cents.

Commissioner Doty urged a requirement that Gulf Interstate and United Fuel serve communities along the route of the line.

Contracts Awarded

Northern, Permian Basin let work on new gas lines

OMAHA.—Northern Natural Gas Co. and its affiliate, Permian Basin Pipe Line Co., have awarded contracts for approximately 539 miles of natural-gas lines.

Permian Basin awarded contract to R. H. Fulton & Co. for 280 miles in the Midland, Tex., and Hobbs, N. M., areas. This project includes 96 miles of 30-in., 35 miles of 24-in. and 70 miles of 20-in. line. The remainder of the project is for gathering lines of 16-in., 24-in. and 26-in. diameter. It is expected that the Fulton organization will have a spread for gathering line work and a large spread for main lines.

Northern Natural Gas Co. contracted three sections in areas between Texas and Iowa.

Section 1 awarded to R. H. Fulton & Co. consists of approximately 92 miles of 30-in. line, including 52 miles for the extension from Dumas via Sunray, Tex., to the main line at a point north of the Canadian River and two loops of approximately 20 miles each near the Beaver, Okla., compressor station.

Section 2 awarded to Lone Star Constructors consists of approximately 70 miles of 30-in. line, near compressor stations as follows: 15.8 miles south of Mullinville, Kans.; 9.9 miles north of Bushton, Kans.; 10.6 miles north of Clifton, Kans.; and 33.3 miles north of Palmyra, Neb.

Section 3 awarded to G. G. Griffis Construction Co. includes 26.6 miles of 24-in. for two loops near Paulina Station, Iowa; 70.8 miles of 30-in. line for a 31.6 mile loop near the Ogden Station, Iowa; and 39.2 mile loop near the Oakland Station, Iowa.

Ohio Fuel Gas to Lay Two New Gas Lines by August

LANCASTER, Ohio. — Ohio Fuel Gas Co. has announced plans for a $2,307,290 pipe-line-construction project, to be completed in August.

Plans include 26 miles of 20-in. line from nearby Crawford station directly west to Mt. Sterling, to be built by Ohio Pipeline Construction Co., Granville, at a cost of $1,276,290.

Shamrock Construction Co., Lansing, Mich., is laying 22 miles of 20-in. line between the Centerville measuring station, Montgomery County, and Howell Junction, Green County. This will cost $1,031,000.

Both sections will be improvements on the 92-mile line from Centerville to Crawford station.

West Coast Firm Gets Contract for Pasco Line

SPOKANE, Wash.—Salt Lake Pipe Line Co. has awarded contract for a 135-mile products line from Pasco, Wash., to Spokane to Lyles & Young Co., Avenal, Calif.

The project is an extension of the existing Salt Lake-Pasco line and will cost $4,500,000, including pumping and terminal facilities. Work on the 8-in. line will be completed in September. Capacity will be 12,000 bbl. daily

Contract for the Pasco pumping station has been awarded to Morrison-Knudsen Co., Boise, Idaho.

Texas Illinois to Boost Capacity 130,000 M.c.f.

HOUSTON. — Compressor horsepower is being increased on Texas Illinois Natural Gas Pipeline Co.'s trunk line from Hungerford, Tex., to Joliet, Ill., to provide for an additional 130,000,000 cu. ft. daily of capacity.

Plans which call for increasing horsepower at five existing stations and building six new stations will raise line capacity to 505,000,000 cu. ft. daily.

The six stations which are to be constructed will be located near Wharton and Lufkin, Tex.; Texarkana and Searcy, Ark.; Jackson, Mo.; and Hammond, Ill.

Sunray Plans Products Line

TULSA.—Sunray Oil Corp. is carrying on negotiations to build a 440-mile, 10-in. products pipe line from its refinery at Duncan to a water-transportation terminal on the Mississippi River.

The line would have a capacity of from 40,000 to 50,000 bbl. daily. It will give the company the benefit of water transportation rates.

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HERE'S HOW TAPECOAT® HAS STOOD THE TEST OF TIME TO SOLVE CORROSION PROBLEMS

PROOF (Underground) — Inspection of TAPECOATED joints after 10 years of underground service showed no sign of corrosion when the TAPECOAT was removed.

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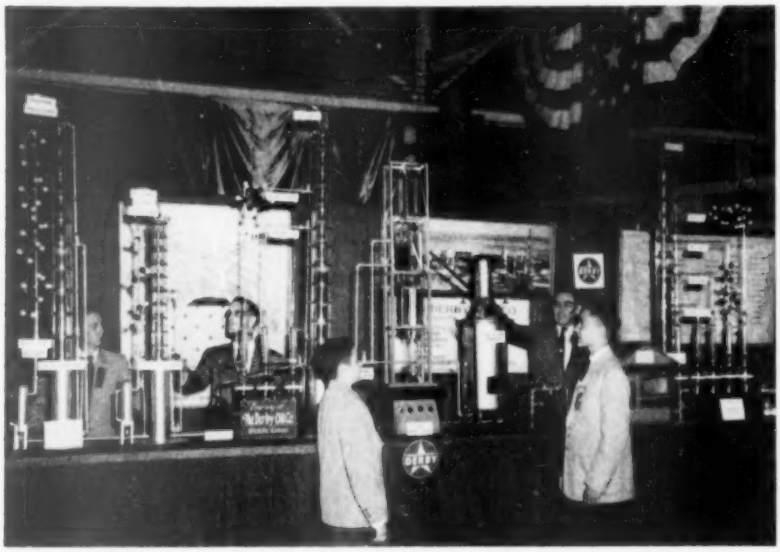

Miniature Refinery Exhibited at I.P.E.

This scale model of a modern refinery with all working parts visible was presented by Derby Oil Co. at the recent 1953 oil show in Tulsa. Construction of this miniature plant has been a hobby of F. W. McCurry, Derby's vice president in charge of manufacturing, seen at right of the miniature upflow heater shown in photo. All of the model's furnaces are equipped with electrical resistance heaters, and all fractionating towers have internal counterflow of liquid versus gas.

Warren Petroleum Plans New Petrochemical Unit

TULSA.—Warren Petroleum Corp. plans to enter the petrochemical field, according to announcement by W. K. Warren, chairman of the board, and James E. Allison, president.

The company will build a petrochemical plant at its Warren gas terminal on the Houston ship channel and completion is expected by January 1954.

The firm said the hydrocarbon oxidation process will be used to convert either propane or butane, or their mixtures, into pentaerythritol, called "PE" in the chemical industry, methyl alcohol, acetaldehyde, and other petro-

NELSON REFINERY CONSTRUCTION INDEX

Appears in the first issue each month.

Explanation—"News Items that Appear in Quarterly Cost Indexes," July 7, 1952, pages 105 and 106.

Compiled by W. L. Nelson—Petroleum Refinery Consultant—Tulsa.

Indexes of Individual Equipment Items—January, April, July, and October.

Index (1946 = 100)

	1948	1949	1950	1951	1952	Feb. 1953
Pumps, compressors, etc.	127.0	135.9	138.2	155.9	155.6	156.2
Electrical machinery	127.6	130.9	134.9	154.3	152.4	151.7
Internal combustion engines	116.9	124.8	126.0	146.1	146.5	146.2
Instruments	120.0	122.0	127.8	142.3	146.2	148.1
Heat exchangers	130.0	133.0	140.0	152.0	165.8	169.4
Miscellaneous equipment average	*122.1	*121.6	*126.2	*145.1	153.3	154.3
Materials component	139.3	143.6	149.5	164.0	164.3	167.4
Labor component	128.0	137.1	144.0	152.5	163.1	169.8
Refinery construction index	132.5	139.7	146.2	157.2	163.6	168.8

*Used in computing the Nelson Index until April 1952. These are slightly different than the average of the Miscellaneous Equipment Items shown above.

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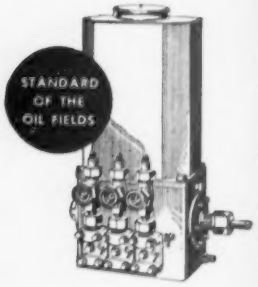

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McCORD
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chemicals. Annual production will include approximately 2,500,000 lb. of "PE," 4,000,000 lb. of methyl alcohol, and 2,000,00 lb. of acetaldehyde.

No additional financing is anticipated in connection with the new plant.

Eastman Kodak to Build New Polyethylene Plant

LONGVIEW, Tex.—Eastman Kodak Co. has announced it will go ahead with plans to build a polyethylene unit with an annual production capacity of 20,000,000 lb. at its plant here.

Agreements have been signed with Britain's Imperial Chemical Industries, Ltd., for licensing their process.

The company has long held a certificate of necessity for the proposed plant, granting rapid amortization on its estimated $7,000,000 cost. A second certificate was received covering the $3,800,000 cost of a proposed plant for the production of a new synthetic hard wax composed of ethylene polymers.

Natural gas for fuel and for petrochemical synthesis is obtained from Trawick field in Nacogdoches County, 50 miles distant. Ethylene feed for the new plant will be derived from propane supplied by Humble Oil & Refining Co. from the London natural-gasoline plant located in East Texas field.

The decision to build the Longview plant will further boost polyethylene capacity in this country *(The Oil and Gas Journal, May 18, page 218)*. Firm commitments on new facilities will more than quadruple the present capacity of 125,000,000 lb. per year.

Dividend Payments Drop

WASHINGTON.—Publicly reported cash-dividend payments by oil-refining corporations in April dropped to $4,600,000 from $7,800,000 in the corresponding month of 1952, according to a survey by the Department of Commerce.

For the 4 months ended with April, however, dividend payments aggregated $242,700,000 compared with $244,500,000 for the same period last year.

Agency Invites Bids

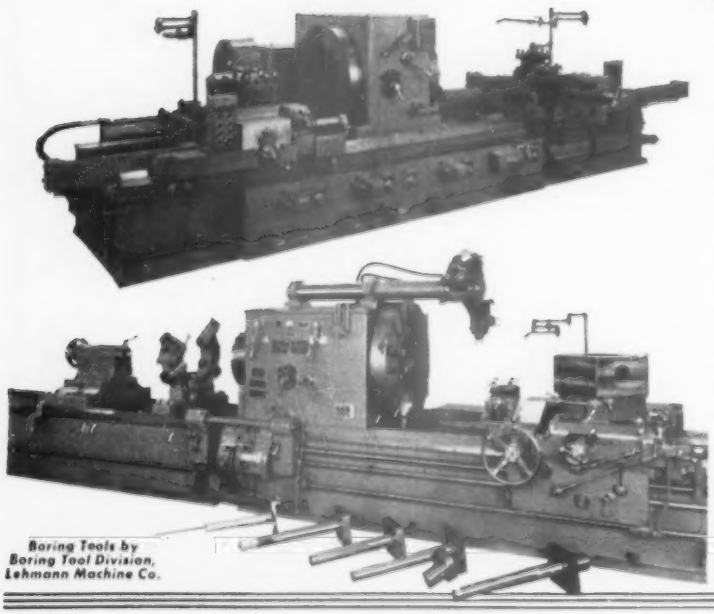
WASHINGTON.—The Armed Services Petroleum Purchasing Agency has invited bids, to be opened June 4, for the rerefining of an estimated 2,429,286 gal. of lubricating oil during the fiscal year beginning July 1.

DOUBLE LARGE HOLE ENDER

LEHMANN HYDRATROL LATHES

LARGE HOLLOW SPINDLE
DOUBLE END TYPE

42" swing, 16 foot bed, 18" hole in spindle—Special headstock for short work piece. Semi-automatic multiple, longitudinal and cross feeds hydraulically operated on both ends of headstock.



Boring Tools by Boring Tool Division, Lehmann Machine Co.

50" swing—50 foot length, 19" hole in spindle. 24" Hexagon Turret on carriage with profile bar for profile boring and grinding. Retractable diamond profile wheel dresser. Weight 72,000 lbs.

Double End Hydratrol Lathes are built in sizes from 18" with holes up to 7⅛" to larger sizes with holes to suit the job. Double End operations avoid necessity for resetting the work, and insure relative concentricity of boring and turning operations and squareness of faces at both ends.

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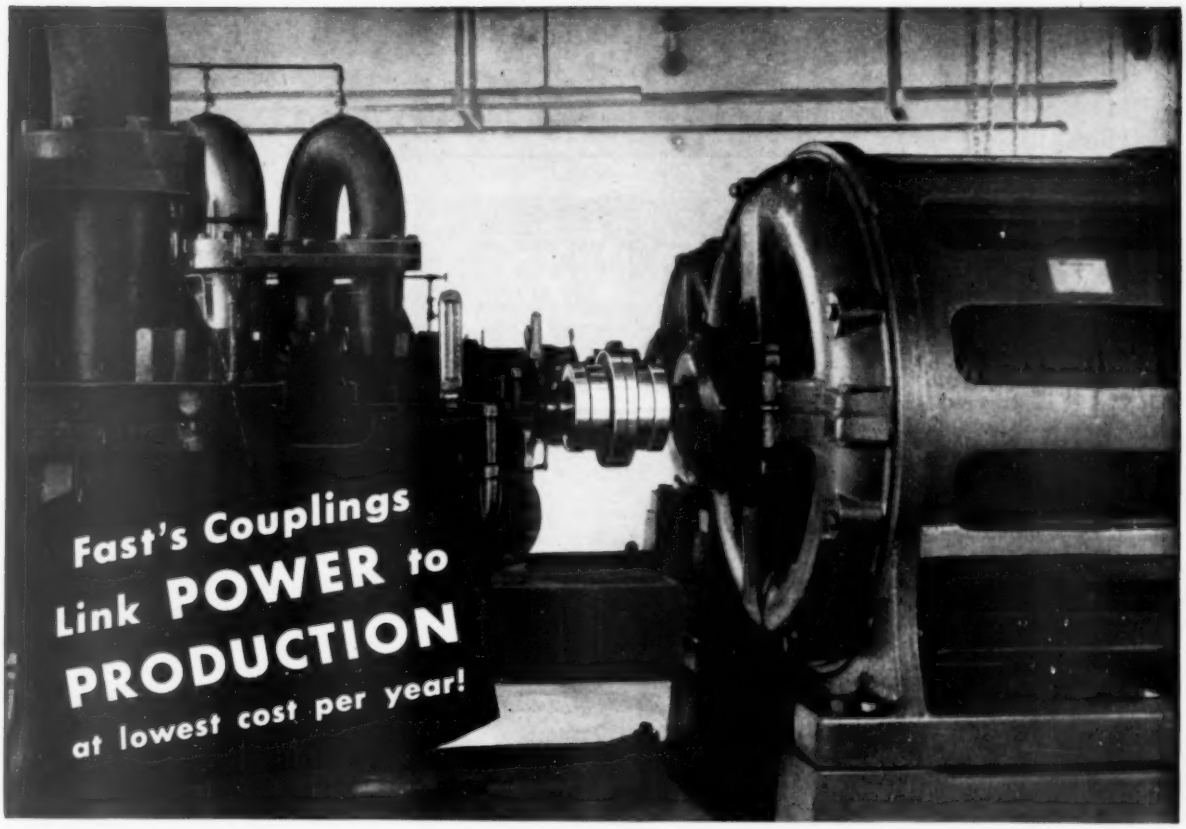

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(See SSC's ad in the next issue)

Among the Drilling Contractors

E. K. Carey Drilling Co., Inc., Denver

ONE of the most active companies, both as a drilling contractor and producer, operating in the Salina basin area of East Central Kansas is E. K. Carey Drilling Co., Inc. Started by E. K. Carey, present principal owner, in 1936, it, in recent years, has received considerable attention through its series of successful strikes in the Salina basin. It also has been an active contractor and operator in the northeastern Colorado portion of the Denver-Julesburg basin.

Location . . . Headquarters of the firm are in the Midland Savings Building, at Denver, where Carey makes his home. The company's field operations, directed by Herb Rhoton, are carried on from its McPherson, Kans., district office and main yard. Land and geological offices are maintained in the Central Building, Wichita.

Operations . . . Carey was one of the principal developers of the Smolan-Viola field, about 8 miles southwest of Salina, Kans. Last December, this production was sold to Republic Natural Gas Co., Dallas. Included in the sale were 27 producing wells, and approximately 1,100 acres of proved acreage in that field. Since the sale, Carey has kept its two rotary rigs in that field active in drilling up the acreage for the new owners. To date, Carey has drilled 10 wells for Republic and has contract to drill 5 more to be completed by June 30.

Equipment-Performance . . . The two rotary rigs operating in the Smolan-Viola field are each capable of drilling to depths of at least 4,500 ft. In addition to the rotary rigs, the company has one cable-tool rig in the area which is used primarily in completion work. In 1952, the two rotary rigs drilled 50 wells and cut a combined total of 161,725 ft.

Personnel . . . Herb Rhoton, an independent cable-tool drilling contractor before joining Carey in 1937, is general superintendent. Sid A. Keefover, who joined Carey late last year as production superintendent, previously had served in both drilling and production capacities with Olson Drilling Co. Don Hollar, formerly geologist for Derby Oil Co. is head of the land and geological department with offices at Wichita.

Arland Bruce, driller for Carey for 11 years, recently has been made tool pusher. Delbert Saffer, who has been with Carey for 13 years, is trucking foreman. Ob Swiger, who had served 25 years with Ohio Oil Co. as office

Pictured at E. K. Carey Drilling Co.'s main yard in McPherson, Kans., are, left to right: Ob Swiger, office manager; Herb Rhoton, general superintendent; Delbert Saffer, trucking foreman; Arland Bruce, tool pusher; and Sid A. Keefover, production superintendent.

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clerk, joined the Carey organization in July 1951 when the company purchased Ohio Oil Co.'s yard and camp in McPherson.

J & C Drilling Co. has a contract with La Gloria Corp. for a 5,800-ft. test to be drilled at a wildcat location a mile northeast of production of the Reynolds field, in Jim Wells County, South Texas. Location is for 1 Miller, in Block 7, Reese & Dunn Oil & Gas Subdivision.

Meyers Drilling Co. is the contractor on a new exploratory well which Arthur C. Fisher and J. H. Maurer are starting just north of Cuyama Valley at the south end of the Carrizo Plains, 10 miles east of the Russell Ranch field, in San Louis Obispo County, California. Location is in 36-11n-26w.

Paul F. Rutledge, Santa Fe, N. M., has contracted for two Madison lime tests to be drilled for M. B. Rudman Co., Dallas, in the Tioga area of North Dakota. Rig is being moved in for the first test located in the SW NE NE 7-158n-94w. Drilling of the second test will follow completion of the first.

J. I. Roberts Drilling Co. has a contract from Skelly Oil Co. for a Tuscaloosa test to be drilled at a wildcat location in 19-9n-7e, Catahoula Parish, East Central Louisiana. The test, 1 Meyers, is on a 5,000-acre block which Skelly is undertaking to evaluate.

Tullous Drilling Co. has contracts with Atlantic Refining Co. for two 7,250-ft. stratigraphic tests to be drilled in the North Lessley area of Wilkinson County, Mississippi. The first, 1 Wax-Morgan, will be a north offset to the discovery well in the southeast part of 22-3n-3w. The second, on the same lease, will be located about ½ mile northeast in Section 23.

ACTIVE ROTARY RIGS*

Area—	Week ended 5-25-53	Change week ended 5-18-53	Change week ended 5-26-52
Gulf Coast	597	−27	− 37
N. & W. Tex.-N. M.	802	− 5	−203
Ark.-N. La.-E. Tex.	118	− 7	− 27
Oklahoma	327	+ 8	+ 15
Kansas-S. Nebraska	168	−10	− 3
Illinois-Eastern	119	− 4	− 31
Rocky Mountains	236	+13	+ 7
Pacific Coast	164	− 3	− 1
Total U. S.	2,531	−35	−280
Western Canada	138	+ 8	− 45
Total	2,669	−27	−325

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States, North and West Texas-New Mexico, and Oklahoma-Kansas are shown on pages 161 and 162.

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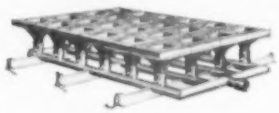

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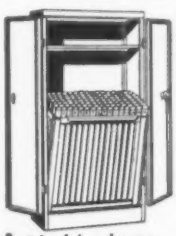

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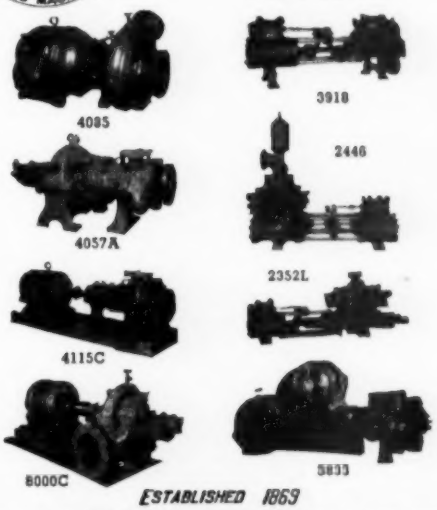

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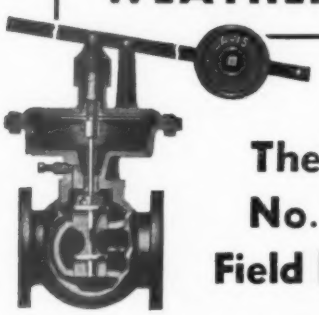

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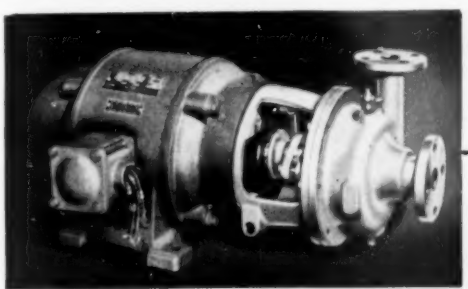

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P-6

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LEADING THE FIELD OF SEISMIC EXPLORATION

EXPLORATION

What Role Should Gravity Play?

by Philip C. Ingalls

ONE problem of those men who must plan and coordinate exploration programs is determining how gravity should be used.

Gravity surveys are a well-established exploratory tool. They early proved their value in the development of the Gulf Coast salt-dome country and more recently have had notable successes in restricted areas throughout the country. There is no general agreement among geophysicists, however, as to the role gravity surveying should play in an over-all exploration program.

On a per acre basis, gravity surveying costs only about one-fifteenth as much as seismic work, but some exploratory-program planners ask, "is it worth even that much? If it is, should gravity be used prior to seismic work as a reconnaissance tool, or following seismic work as a detailing tool? If as a reconnaissance tool, how can a meaningful anomaly be distinguished from the many anomalies caused by conditions that have no relation to oil accumulation?"

A symposium conducted under the auspices of the Geophysical Society of Tulsa was designed to glean possible answers to these questions. Each of the speakers* stated his opinion as to how general and how restricted gravity exploration should be. Three discussed certain phases of the usefulness of gravity surveys while the fourth emphasized the limitations of the method

No clean-cut answers resulted, but an exchange of ideas between gravity and seismic men provided valuable guides for specific problems.

It was pointed out that detailed gravity surveys can be profitably used (1) for reconnaissance to direct seismic operations if the gravity surveys are accurate, have adequate spacing for the area's particular problem, and above all, are of high quality, not merely "spurious statistical assemblages"; (2) to aid geologists in mapping in that gravity may provide the tipoff on how to hook up faults or how to move on structure; (3) to aid the seismologist when data are ambiguous; (4) in no-reflection areas to locate wells; (5) for rapid information on entering frantic land plays; (6) for detailed quantitative analysis of individual structures, especially around salt plugs; and (7) to develop new prospects by frequent review of gravity maps in the light of information which has become available from other sources.

The limitations of gravity surveying were boiled down to three major factors: (1) Technical—terrain and near-surface effects; (2) Interpretive—total field effect and lack of density data; and (3) Psychological—gravity data cannot be put in familiar geologic terms. Gravity men too often disagree among themselves causing a lack of confidence in their data, and, as a result, gravity seldom gets proper appreciation and proper utilization in an exploration program.

In the discussion following the formal panel, seismologists asked: If gravity cannot condemn any area and if all gravity anomalies are not structures, why not use seismic first (where it works) and restrict gravity to no-reflection areas, and to situations where clues are needed because seismic data are not clearly interpretive? The panel's answers brought out these points: Gravity surveys are not uniformly successful in every area so no blanket rule can be laid down for their use. Certainly areas where gravity tells the complete story are exceptional. However, even slight guidance will pay off because of the difference in the costs of the seismic and gravity methods.

There are many cases where gravity provided the initial indication of anomalous conditions in areas which were to yield oil fields pinpointed by and credited to other exploratory methods. One speaker suggested that in the search for stratigraphic traps, the gravimeter may be the tool of the future—one of the few truly new advances in geophysical exploration in recent years is that of the initiation of the study of density contrasts by bore-hole measurements.

*The panel, arranged by L. Y. Faust, Amerada Petroleum Corp., was composed of Joseph W. Northrop, The California Co., New Orleans; E. V. McCollum, E. V. McCollum & Co., Tulsa; Sigmund Hammer, Gulf Research & Development Co., Pittsburgh; and Russell A. Weingartner, Stanoline Oil & Gas Co., Tulsa. Paul L. Lyons, Anchor Petroleum Co., Tulsa, was moderator.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

WEST TEXAS . . . Gulf Oil Corp. 1 Lea, central Crane County multiple-pay discovery, has indicated 98 ft. of Ellenburger pay from 8,132 ft. Drill-stem test at 8,180-8,230 ft. flowed 146 bbl. of oil in 8 hours. In northeast Midland County, Magnolia Petroleum Co. has a prospective Strawn discovery at 1 Oldham near the Germania section of the Spraberry trend. Drill-stem tests at 10,220-10,311 ft. recovered clean oil.

LOUISIANA . . . The Texas Co. has opened 14,000-ft. production at its Dog Lake field in the coastal marshes of southern Terrebonne Parish. The 1 Dog Lake unit, 10, 3,000 ft. from other production, flowed 112 bbl. of 33.7°-gravity oil per day through 10/64-in. choke from casing perforations at 14,113-30 ft.

ROCKY MOUNTAINS . . . In Utah, El Paso Natural Gas Co. tested gas at a rate in excess of 2 M.M.c.f. daily from upper Wasatch sands at 2,900 ft. In Montana, Empire State Oil Co. has an apparent new pool opener 2 miles north of existing production in the East Poplar area of Roosevelt County. A Madison test at 5,748-64 ft. recovered 3,900 ft. of clean oil and 214 ft. of oil-cut mud. In Colorado, Forest Oil Co.'s "J" sand discovery has been completed for a flow of 262 bbl. daily.

Crude Oil and Lease Condensate

BY STATES, BY SQUARE MILES OF SURFACE AREA

(Thousands of barrels)

State—	Sq. miles	Recovery to 1-1-'53 Total	Recovery to 1-1-'53 Per sq. mi.	Est. ultimate recovery Total	Est. ultimate recovery Per sq. mi.	Remaining reserve Total	Remaining reserve Per sq. mi.
Arkansas	53,102	854,000	16.1	1,142,000	21.5	288,000	5.4
California	158,693	9,334,000	58.8	13,499,000	85.1	4,165,000	26.3
Colorado	104,247	204,000	2.0	504,000	4.8	300,000	2.8
Illinois	56,400	1,624,000	28.8	2,209,000	39.2	585,000	10.4
Indiana	36,291	223,000	6.5	278,000	7.7	55,000	1.2
Kansas	82,276	2,315,000	28.1	3,325,000	40.4	1,010,000	12.3
Kentucky	40,395	276,000	6.8	341,000	8.4	65,000	1.6
Louisiana	48,523	3,033,000	62.5	5,613,000	115.7	2,580,000	53.2
Michigan	58,216	349,000	6.0	429,000	7.4	80,000	1.4
Mississippi	47,716	357,000	7.5	782,000	16.4	425,000	8.9
Montana	147,138	187,000	1.2	357,000	2.4	170,000	1.2
Nebraska	77,237	11,000	0.1	29,000	0.4	18,000	0.3
New Mexico	121,666	794,000	6.5	1,576,000	13.0	782,000	6.5
New York	49,576	186,000	3.8	239,000	4.8	53,000	1.0
North Dakota	70,665	1,000		125,000	2.0	124,000	2.0
Ohio	41,222	627,000	15.2	653,000	15.8	26,000	0.6
Oklahoma	69,919	6,578,000	94.1	8,558,000	122.4	1,980,000	28.3
Pennsylvania	45,333	1,147,000	25.4	1,269,000	28.0	122,000	2.6
Texas	267,339	15,766,000	59.0	31,370,000	117.3	15,604,000	58.3
Utah	84,916	5,000	0.1	45,000	0.5	40,000	0.4
Wyoming	97,914	1,051,000	10.7	1,976,000	20.2	925,000	9.5
Total	1,758,784	44,922,000	25.5	74,319,000	42.2	29,397,000	16.7

BY STATES, BY CUBIC MILES OF SEDIMENTS

State—	Cubic miles	Total	Per cu. mi.	Total	Per cu. mi.	Total	Per cu. mi.
Arkansas	54,000	854,000	16.0	1,142,000	21.0	288,000	5.0
California	58,000	9,334,000	161.0	13,499,000	233.0	4,165,000	72.0
Colorado	80,000	204,000	2.5	504,000	6.3	300,000	3.8
Illinois	40,000	1,624,000	40.0	2,209,000	55.0	585,000	15.0
Indiana	30,000	223,000	7.4	278,000	9.2	55,000	1.8
Kansas	62,000	2,315,000	37.0	3,325,000	54.0	1,010,000	17.0
Kentucky	46,000	276,000	6.0	341,000	7.4	65,000	1.4
Louisiana	160,000	3,033,000	19.0	5,613,000	35.0	2,580,000	16.0
Michigan	65,000	349,000	5.3	429,000	6.6	80,000	1.3
Mississippi	115,000	357,000	3.0	782,000	6.8	425,000	3.8
Montana	165,000	187,000	1.1	357,000	2.1	170,000	1.0
Nebraska	55,000	11,000	0.2	29,000	0.5	18,000	0.3
New Mexico	80,000	794,000	10.0	1,576,000	19.7	782,000	9.7
New York	25,000	186,000	7.4	239,000	9.5	53,000	2.1
North Dakota	70,000	1,000		125,000	1.8	124,000	1.8
Ohio	50,000	627,000	12.5	653,000	13.0	26,000	0.5
Oklahoma	120,000	6,578,000	54.8	8,558,000	71.3	1,980,000	16.5
Pennsylvania	25,000	1,147,000	45.9	1,269,000	50.7	122,000	4.8
Texas	600,000	15,766,000	26.0	31,370,000	52.0	15,604,000	26.0
Utah	65,000	5,000	0.1	45,000	0.7	40,000	0.6
Wyoming	125,000	1,051,000	8.4	1,976,000	15.8	925,000	7.4
Total	2,090,000	44,922,000	21.5	74,319,000	35.6	29,397,000	14.1

Production and reserve estimates as of January 1, 1953, are based on figures compiled for the Journal's Annual Review and Forecast number. Approximations of volume of sedimentary rocks are from L. G. Weeks, Standard Oil Co. (N. J.), and do not include sediments that lie below 20,000 ft. of burial.

Some Reserve Figures You Can File and Forget

THE accompanying tables show how the estimated proved reserves of crude oil and lease condensate are divided by states in terms of recoveries by square miles and by cubic miles.

Interpret these data as you please. Obviously no direct comparisons are valid. Some of the states have been prospected for years, others are comparatively young as oil-producing states. In some states the potentially productive area is extremely limited, in others the entire state, or nearly so, offers possibilities for production. Secondary recovery has already played a significant part in some states, others have seen none or very little to date. Some states have extremely thick sedimentary sections but limited areal extent, others have thin sections but extensive area, and still others have both thick sections and extensive area.

If all significant producing states had California's proved estimated ultimate recovery per cubic mile there would be more than 400 billion barrels of oil remaining to be proved in United States.

OKLAHOMA

Activity to West of Golden Trend Increases

Connecting areas between Northeast and East Purdy pools and Garvin County's Golden Trend production has good prospects of success.

Phillips Petroleum Co. 1 Mayes "A," C NW NW 7-3n-3w, is a new well off the south flank of Northeast Purdy pool. To the south Magnolia Petroleum Co. is waiting

Map of the Golden Trend area of Garvin County, Oklahoma. Arrows indicate western Garvin County's rapidly expanding new pools, Northeast and East Purdy. A fill-in program between Northeast and East Purdy pools and Golden Trend production to the east is under way.

for rotary tools at 1 Duncan-Neill unit, NW NE SW Section 7. Superior Oil Co. has a Hart sand extension success at 1 Iris Arner et al, C NE SE Section 7. Sun Oil Co. is drilling an east offset at 1 Denson, C NW SW Section 8.

Phillips is under way at a well off the north flank of East Purdy pool. Deep Rock Oil Corp. is to test the Hart at another field well, and has made location for still another well. Magnolia Petroleum Co. has another well drilling in East Purdy in the C SE SE of Section 18, and one in the C NE SE of Section 18. Phillips has a success to the southwest in the pool.

Between East Purdy and the Golden Trend production to the east Trans-Tex Drilling Co. is testing Hart sand perforations at 1 Denson, C SE SE Section 17. The well gaged 280 bbl. of oil in 18 hours on an earlier gage. Superior Oil Co. 1 Crawford in the C SE SE 20-3n-3w, is drilling off the west flank of production to the east.

Development in the Northeast Purdy area has been characterized by high volume producers and good outpost success. The pool, located in western Garvin County, was opened last year at Magnolia 1 Duncan-Alcorn unit, NE NE SE 1-3n-4w, for 566 bbl. of oil per day from the Springer. Hart sand production was opened this year at Superior 1 Arner, C NE SE 7-3n-3w.

East Purdy pool was opened last year at Phillips 1 Denson, SW SW SW 18-3n-3w, for 163 bbl. of oil per day from the Hart sand. Phillips later completed a dual well in Section 18 in the Hart and Springer sands.

Production Tests Begin At Logan Prospect

Production tests are slated to begin at Walter Duncan 1 Jackson, indicated discovery in Logan County. A drill-stem test at 6,262-85 ft. in the Prue sand indicated production with drill-pipe recovery of 3,000 ft. of gas, 120 ft. of oil and gas-cut mud, and 58 ft. of free oil. The possible new pool opener is located in the NE NE SE 35-15-4w.

New Pay Discovery In West Garrett Pool

Kay County's West Garrett pool has a new pay discovery at Charles L. Jenkins 1 Gingerich, SE SE NE 34-27n-1e.

The well flowed 500 bbl. of load oil and new oil in 24 hours after fracture treatment of perforations at 3,216-30 ft. in Cleveland sand. Flow was through a 1-in. choke. A smaller choke flowed 39 bbl. of oil in 6 hours.

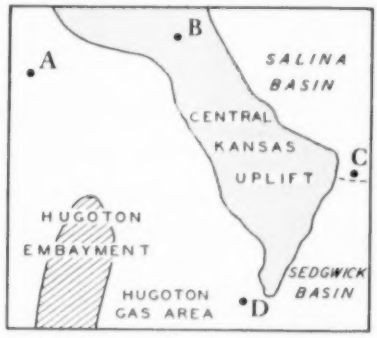
This new pay discovery is the west offset to the field's discovery well, Manahan Oil Co. 1 Charlie Bowman, a Simpson sand strike which pumped 15 bbl. of oil per day. The 1 Gingerich is also the second well for the new pool.

KANSAS

Rank Test Slated in Far Northwest Kansas

Bankoff Oil Co. has staked location for a remote wildcat at 1 Reams, NE NE SE 10-8s-40w, 2½ miles northwest of the town of Goodland in the far northwestern Kansas area in Sherman County. (A on map).

Nearest production to the new test is 45 miles east in Thomas County's Mingo pool. The test will go to the Mississippian lime topped at about 5,300 ft. The rank wildcat is located on the east flank of the northernmost extension of the Las Animas arch.



Map of the western half of Kansas showing the Salina and Sedgwick basin areas, the Central Kansas uplift, and the Hugoton embayment.

Operator Installing Pump At Rank Norton Wildcat

Pump is being installed at a remote Norton County wildcat at the extreme northern end of the Central Kansas uplift in wildcat territory.

Jones, Shelburne & Farmer's 1 Lawson (B on map), SE SE NW 36-3s-24w, swabbed 20 bbl. of oil per hour natural from the Arbuckle. The discovery is 23 miles northwest of Ray pool, the nearest production. Norton County has only four small producing oil pools. The new strike is located in the central part of the county, southwest of the town of Norton. Top of the Arbuckle was cut to 3,779 ft. Top of the Lansing is 3,532 ft.

New Discovery Due McPherson County

Anschutz Drilling Co. 1 Fleming, SE SE NE 10-20s-4w, is a possible new pool discovery for central McPherson County. (C on map).

The wildcat is located 6 miles west of Johnson pool, the nearest production, and 4 miles southwest of the town of McPherson at the extreme southern end of the Salina basin. A drill-stem test in the Viola at 3,727-36 ft. recovered 60 ft. oil, 85 ft. muddy oil and 60 ft. oil-cut mud. Crews are drilling on.

Rank Test Slated in Northern Comanche

A rank wildcat test is slated for the northern basin shelf of the Anadarko basin in Comanche County, off the southern slope of the Central Kansas uplift. (D on map).

The new wildcat is being rigged up at United Production Co. 1 McCrary, C NW SE 35-31s-18w. The remote wildcat is 12 miles southwest of Robbins Ranch pool in the northern part of Comanche County.

Just north of the vast Hugoton gas area Salina Drilling Co. is below 3,000 ft. at a wildcat in Finney County in the Hugoton embayment. The 1 Gano estate, NW NW SW 24-21s-33w, is located 7 miles east of Nunn pool and 6 miles northeast of Damme pool. Finney County has only five small oil pools, one of them, Byer, being located in the midst of Hugoton gas production. The Hugoton gas area covers most of the county with the oil pools being located on the flanks of the Hugoton embayment.

Four New Kansas Pools

Four new discoveries have been completed in four different counties in Kansas to give the state two new gas pools and two new oil pools. Champlin Refining Co. opened Nurse pool in Barber County at 1 Nurse, NE NE NE 23-31s-13w. The well delivers 4,000 M.c.f. of gas per day from the Douglas sand. Pollnow pool is a new producing area in Decatur County, opened by Anderson-Prichard Oil Corp. at 1 Pollnow, NE NW SW 4-3s-29w. The discovery was finaled for 79 bbl. of oil per day from the Lansing. Harper County in southern Kansas, has a new pool at The Texas Co.'s 1 Springer, NE NE SE 23-31s-6w. The gas discovery well flowed 3,800 M.c.f. per day from the Arbuckle. Imperial Drilling Co. has a new discovery in Trego County at 1 Walker, SW NE SW 4-11s-23w. Depthograph potential of the discovery is 2,192 bbl. of oil per day from the Lansing.

LOUISIANA

NORTH LOUISIANA

New Pay at Redland

Continental Oil Co. has completed a new pay discovery in Redland field at 1 Keoun, Section 29-23n-12w, just southeast of the field discovery well in Bossier Parish. The well pumped 48 bbl. of 42.2°-gravity oil per day. Two other wells in the new field have had Pettit shows, but this new discovery is the first successful completion in that zone.

Northeast of the Pettit producer at 1 Covington, Continental is reported to have found

shows in the Buckrange at 2,866 ft. Other wells in the area have had Buckrange shows, but no completions have been made as yet in that zone.

New Strike Made West of Springhill

A new Tokio oil producer is reported 1 mile west and south of established Tokio sand production in Webster Parish's Springhill field. John B. Stephens and A. O. Phillips 1 W. A. Griffin, C NW SE SW 2-23n-11w, pumped 124 bbl. of 37°-gravity oil per day. Testing continues from open hole at 3,144-48 ft.

A Tokio show is reported at the southwest diagonal offset to the 1 Griffin at 2 Griffin, C SW SE SW 2-23n-11w. Crews are drilling below 4,800 ft. for the Pettit.

The prospective new producers on the west and southern flanks of the rapidly expanding Springhill field give considerable promise for extension of the field to the west. The limits of the field in the Springhill town area and across the state line into Columbia County, Arkansas, are practically defined. The western and southwestern flanks of the field are still prospective producing areas.

Blackburn Discovery Finaled in Bodcaw

Pan Am Southern Corp. and Sunray Oil Corp. have completed the discovery well of new Blackburn field in Claiborne Parish in the Bodcaw sand of the Cotton Valley through perforations at 8,716-27 ft. The discovery well, the 1 Woods, NW SE 30-22n-8w, flowed 50 bbl. of 58.6°-gravity condensate at 982 M.c.f. of gas per day.

Confirmation Staked At New Buck Bayou Pool

An east offset and confirmation try to Buck Bayou field in central Concordia Parish, east central Louisiana, has been staked at Hunt Oil Co. 2 John Dale, Jr., Section 6-6n-8e. The test will go to 6,500 ft. to test all Wilcox sands productive in the area.

The new pool was opened recently at Billups Bros.-Vasser & Brown, Inc., 1 B. D. King et al, Section 1-6n-7e. The discovery well was completed flowing 163 bbl. of 39.1°-gravity oil per day from perforations at 5,310-15 ft. in the Wilcox.

Key Well at South Sarepta Completed

Sunray Oil Corp. has completed the first in a series of key field wells in South Sarepta field, Bossier Parish. The 1 Carrie B. Johnson, Section 15-22n-11w, on the north side of the field, flowed 1,065 M.c.f. of gas and 96 bbl. of 59.2°-gravity condensate per day from perforations at 9,312-19 ft. in the Ardis sand. Sunray is drilling two more wells in the area, while two other tests are slated for the pool.

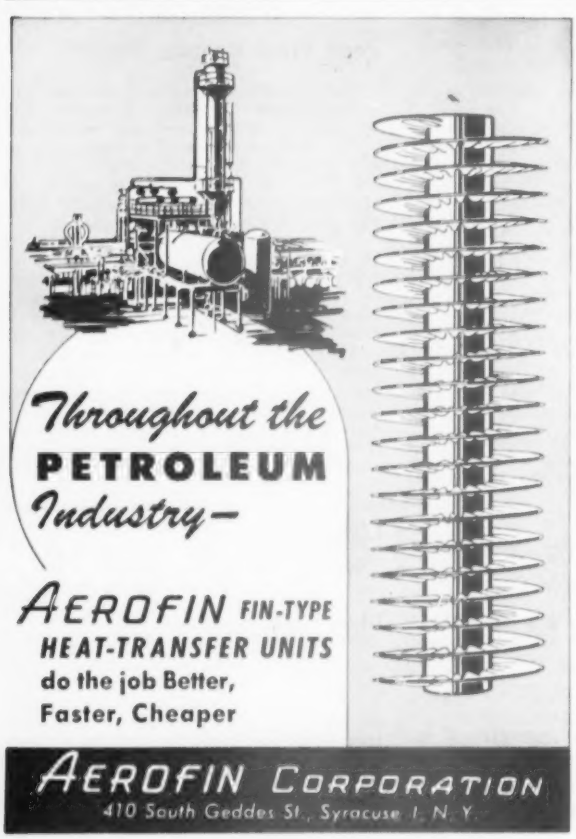
SOUTH LOUISIANA

Third Pay Zone Proved For Phoenix Lake Field

Another producing sand, the third, has been opened by Ohio Oil Co. in the Phoenix Lake field, in southwestern Calcasieu Parish, with the completion by this company of its 26 Brown in a pay zone logged at 8,421-8,523 ft.

The new discovery well, on state potential test, flowed 326 bbl. of oil with 335,000 cu. ft. of gas per day through 10/64-in. choke under tubing pressure of 1,660 psi. Gravity of the oil is 41.3° A.P.I. The company estimates the well is capable of producing up to 5,000 bbl. of oil per day. The well has 64 ft. of net effective sand in the above interval.

The field, which now extends across the Sabine River into Orange County, Texas, at a point just south of the city of Orange, was discovered by Ohio Oil Co. in 1940. Approximately 40 wells have been drilled in developing its two previously known productive sands, one at 7,800 ft. and the other



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at 7,900 ft. So far, 1,300 net acres out of a total of 8,700 acres which the company has under lease in the immediate area have been proved.

14,000-ft. Sand Proves Productive at Dog Lake

The Dog Lake field, located in the coastal marshes of southern Terrebonne Parish, has been added to the list of Louisiana Gulf Coast fields having production below 14,000 ft. Approximately 3,000 ft. north of previous production, The Texas Co. 1 Dog Lake Unit 10, flowed 112 bbl. of 33.7°-gravity oil per day through 10/64-in. choke from a sand, open through casing perforations at 14,113-30 ft., setting a new production depth record for that field.

The field, associated with a shallow, piercement-type salt dome, was discovered in 1929. Original production was from shallow sands overlying and immediately adjacent to the dome. Since then development has been extended steadily to successively deeper sands around and further out from the dome.

Deeper Pay Opening in Vermilion Bay Sector

A new oil-producing area, located west of The Texas Company's Vermilion Bay field, in Vermilion Bay, off the coast of Iberia Parish, has been opened by the same company. The discovery well, 21-B State-Vermilion Bay, flowed 365 bbl. of 39.1°-gravity oil per day through 10/64-in. choke on completion test. Flowing pressure was 2,225 psi. on the tubing. Gas-oil ratio was 225 cu. ft. per barrel. There was no indication of water. Production is from a sand at 12,370-82 ft. (total depth), the deepest in the Vermilion Bay area.

NEW MEXICO

SOUTHEAST NEW MEXICO

Sun's Wildcat Stops At 14,993 Ft.

Sun Oil Co. 1 Harper-Federal, on the east rim of the Delaware basin, apparently was through drilling at 14,993 ft., total depth. Operators had 5½-in. casing set on bottom and will test up the hole.

Possible production was indicated in two sections of the Permian, the Wolfcamp and Bone Springs black shale, but no further oil shows have been reported below the drill-stem test at 12,930-12,950 ft. which recovered 16 ft. of heavily oil-cut mud and 45 ft. of clean, 40° oil.

Tentative formation tops are the Wolfcamp at 11,213 ft. and Strawn at 13,135 ft. Present total depth is believed still in the Pennsylvanian.

Eddy County... Drilling reports from wells along the northern rim of the Delaware basin follow: Richardson & Bass 1 Cobb-Federal cored dolomite and shale with no shows from 16,140-16,185 ft. and was coring ahead below 16,219 ft. A drill-stem test at 15,928-16,038 ft. recovered water blanket and drilling mud.

The same operator's 1 Fidel-Federal was delayed with stuck drill pipe at 12,845 ft. Drill-stem test in this well at 12,231-12,337 ft. flowed gas at the rate of 50,000 cu. ft. daily.

Richardson & Bass 1 Harrison-Federal cored 28 ft. of lime and shale with no shows at 14,000-15,028 ft., and was reaming hole.

Stanolind and Gulf 1 Guadalupe Foothills Unit was drilling below 11,288 ft. in lime and shale.

Anderson Ranch area... Texas Pacific Coal & Oil Co. 1 Lane Mill Unit, north outpost to the Anderson Ranch Devonian discovery, was running low to the discovery, on top of the Woodford shale at 13,510 ft., minus 9,175 ft. Continental Oil Co.'s 1 Anderson Ranch had the Woodford at 13,270 ft. Operators were coring ahead at 1 Lane Mill Unit below 13,617 ft., which was thought to be in top of the Devonian.

Southwest of the Anderson Ranch discovery, Continental 1-Q State was drilling below 10,837 ft.

CALIFORNIA

New Field for San Fernando Valley

Standard Oil Co. of California has completed the discovery well of a new field in the San Fernando Valley, Los Angeles County. The wildcat, 6-1 Mission, 2-2n-16w, about 1 mile north of the Granada post office, produced initially at the rate of 229 bbl. of 24°-gravity oil and 9 bbl. of water through a 24/64-in. choke from 7,200-7,338 ft. Total depth is 7,341 ft. The discovery well is about 1½ miles southeast of production in Aliso Canyon field in which Standard has a substantial interest.

Texas Operator in Cat Canyon Deal

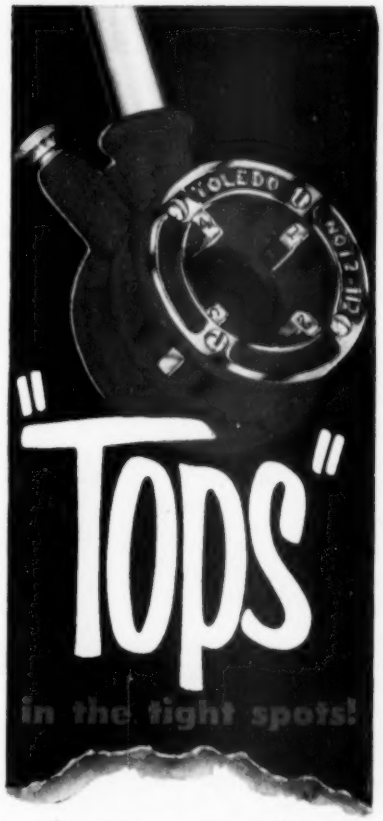
Slick Moorman Producing Co. of San Antonio, Tex., has revealed through its California manager that it has acquired a 1,500-acre lease in the Cat Canyon area of Santa Barbara County from Palmer-Stendel Oil Corp. The property lies on the northeast side of the Cat Canyon field and preparations are under way to drill a wildcat, about ½ mile from the field in 24-9n-33w. There are no producing wells on the property.

California Depth Record Broken

The California depth record was broken this week, as expected, when Ohio Oil Co. exceeded the old mark of 18,734 ft. in its Paloma field deep test, 72-4 K.C.L.A. and continued to drill deeper for a thorough test of the Eocene, which may take the hole to a new world's depth record. Deep prospecting is also going on in North Coles Levee field in Kern County, where Richfield Oil Corp. is drilling 67-29 C.L.A. in 29-30s-25e below 13,300 ft. These two wells and Richfield's B-1 San Emidio, deep test in the Pleito field, also in Kern County, and now drilling below 13,590 ft., are the deepest drilling wells in the San Joaquin Valley.

Mountain View New Pool

Two wells have been completed during the week in the recently discovered new pool on the west edge of Mountain View field in Kern County. M. J. M. & M. Oil Co., which made the Nozu sand (lower Miocene) discovery about a month ago, has completed its northwest outpost, 48 Atlantic-Brantley, in 14-30s-28e, about ¼ mile from the discovery, for 210 bbl. a day of 35°-gravity, clean oil through a 24/64-in. choke. Hancock Oil Co.



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has completed the 1 Miller, a northerly offset, also in Section 14, for 480 bbl. gross, 8 to 30 per cent cut, through a 28/64-in. choke. This appears to indicate that the better wells may be drilled to the northwest and southeast of the discovery. In any case, M. J. M. & M. has acquired the old Pacific Western Oil Corp. 2 Koehler in 29-30s-29e, completed in 1951, and will deepen it in an attempt to pick up the Nozu production found in its discovery well almost 4 miles to the northwest.

TEXAS

WEST TEXAS

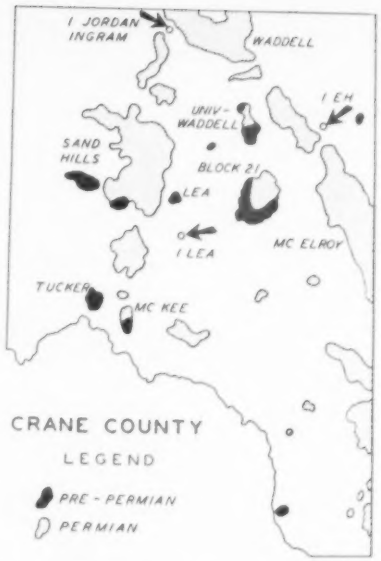
Pre-Permian Prospects In Crane County

Exploration work in or near old producing areas has resulted in flowing oil from the Devonian and Simpson, and shows of Ellenburger oil at three separate Crane County wildcats.

Gulf Oil Corp. and Stanolind Oil and Gas Co. 1-EH State, 10 miles north of Crane and on the eastern flank of McElroy-Permian field, flowed 135 bbl. of clean, 47° oil with no water in 6 hours, on drill-stem test of the Waddell sand (Simpson) at 11,691-11,751 ft.

This well also had good flowing production from the Tubb zone of the Permian around 6,500 ft. Nearest pre-Permian production is in East Dune field, which is Pennsylvanian.

Gulf Oil Corp. 1 Lea . . . Possible Ellenburger oil was seen when a core from 8,132-80 ft. recovered 48 ft. of limestone bleeding oil.



Arrows point out three wildcats currently indicating pre-Permian discoveries in Crane County.

Operators were to drill-stem test the section.

This wildcat topped the Simpson at 7,120 ft. and flowed 317 bbl. of oil in 8 hours on test at 7,530-60 ft., then gaged 379 bbl. of high-gravity oil in 6 hours and 20 minutes at 8,032-82 ft. Field sources identified these sections as the McKee and Connell sands, respectively. Top of the Ellenburger was 8,132 ft. Location is about equal distance from Ellenburger wells in Sand Hills and Block 31 fields.

T. M. Evans 1 Jordan-Ingram . . . Located in northern Crane County, and 2½ miles southeast of pre-Permian wells in Jordan field of Ector County. This well topped the Devonian at 7,805 ft. on estimated elevation of 2,815 ft. A drill-stem test at 7,746-7,845 ft. flowed 30 bbl. of oil an hour for 3 hours. Drill-stem test from 7,853-7,948 ft. recovered 90 ft. of slightly oil-cut mud. Operators were drilling ahead below 8,360 ft. on a 10,000-ft. contract.

Second Well at Glenna

Phillips Petroleum Co. 1-D Puckett has been completed as the second Ellenburger gas well for the field. Potential through 1-in. choke on tubing was 15,850,000 cu. ft. daily, with flowing pressure at 2,078 psi. Distillate was not reported. Calculated open-flow potential was 45,000,000 cu. ft. Perforations in the Ellenburger were from 13,693-13,900, 13,922-13,990 and 14,016-14,100 ft.

Drilling was stopped at 14,327 ft., 117 ft. into granite. Formation tops on derrick floor elevation of 3,321 ft. were: Devonian 10,700 ft., Simpson 11,090 ft., Ellenburger 12,670 ft., and pre-Cambrian 14,210 ft.

Other gas shows were found in the Devonian and the Simpson. At 10,700-10,960 ft. gas volume was 8,000,000 cu. ft. daily. A drill-stem test of the Simpson developed a small amount of distillate-cut mud.

Pegasus extension . . . Sinclair Oil and Gas Co. 13 June Tippett, 48-41-T3S-T&P, extended Wolfcamp production 1 mile northeast of the northwest tip of Pegasus production, being the fourth and largest producer.

Flowing potential was 1,046 bbl. of 42° oil through ½-in. choke from perforations at 10,415-10,445 ft. The well was drilled to

Tubing Gripper *by Baird*

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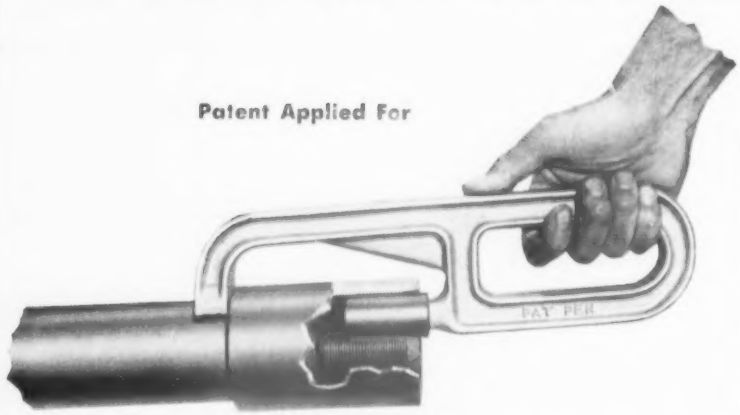

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11,096 ft., in the Pennsylvanian which was dry, and plugged back. Top of pay was 10,415 ft. on elevation of 2,897 ft.

Devonian prospect . . . Humble Oil & Refining Co. 2-O University, north offset to the Wolfcamp discovery of South Andrews pool, had flowing oil from the Devonian at 10,790-10,900 ft. Gas surfaced in 7 minutes and oil in 50 minutes. It cleaned into tanks for 10 minutes, then tanked 33.2 bbl. of clean 48° oil in 2 hours through ¼ and ⅜-in. chokes. Total depth was 10,900 ft .and operators were to core ahead.

A previous test from 8,840-9,064 ft. flowed 116 bbl. of oil in 15 hours. The only marker called has been the Wolfcamp at 8,242 ft., minus 5,697 ft.

NORTH TEXAS

Grayson Exploration Adds New Prospects

New oil from the Dornick Hills sand (Pennsylvanian), for Grayson County has been indicated at B. M. Hester & Son 1 J. G. Huff, wildcat 5 miles southeast of Whitesboro in the Manuel Manchaca Survey, A-783.

Drill-stem test from 5,675-92 ft., open 1½ hours, recovered 600 ft. of oil and 100 ft. of heavily oil-cut mud. Nearest production is 3½ miles to the east, from the 5,100-ft. level. Operators were drilling ahead on a 6,200-ft. contract.

Howell, Holloway and Howell 1 Anna Miller, wildcat 2 miles east of Southmayd, was drilling below 9,401 ft. after testing from 9,373-88 ft. Recovery was 2,000 ft. of gas-cut water, 120 ft. of gas-cut salt water and 60 ft. of oil-cut mud.

Shallow oil show . . . W. L. Pickens 1 Helvey, 2 miles north of Pottsboro in the W. A. Watkins Survey, Block 14, reported 4 ft. of oil-bearing sand at 833 ft. and were running casing for production tests.

South Grayson County drew a 7,500-ft. test as Star Oil Co. 1 E. B. Strawn, located 2 miles south of Dorchester in the Daniel Lloyd Survey.

TEXAS GULF COAST

Karnes County Wildcat Completed as Gas Well

Forney & Winn have opened a new gas-producing field in Karnes County, where their 2 F. W. Kunkel and others, 3 miles west of Hobson in the Don Erasmo Seguin League, produced at the rate of 40,000,000 cu. ft. of gas per day on open flow test. Shutin pressure gaged 1,522 psi. Production is from the upper Reklaw, opposite which casing is perforated at 3,928-38 ft. The well is 500 ft. north of the operators' first test, a dry hole.

Woodbine Prospect In Cherokee County

Bobby Manziel 1 Faye Harris Mason, 2 miles southeast of Rusk, prepared to run production tests of the Woodbine sand after drill-stem testing. Soft drilling and oil stains were reported at 5,087 ft. A 40-minute test from 5,079-89 ft. produced a good blow immediately and unloaded the 780-ft. water cushion, plus some black oil.

Frank & George Frankel 1 Doris Carter, 11,000-ft. operation 1 mile southwest of Ironton, found no shows in the sub-Clarksville and was drilling ahead below 6,209 ft.

San Augustine County . . . Stanolind Oil & Gas Co. 1 J. H. Fox has been scheduled as a 9,500-ft. wildcat. Location is in the William White Survey, 12 miles northeast of the town of Broaddus. Projected depth is expected to test the Travis Peak.

New pay zone . . . Lower Pettit production has been added to West Waskom field of Harrison County at Byrd Oil Corp. and Ed Hurley 9 Josephine Rogers, J. Nations Survey. Completion perforations at 5,824-30 ft. gaged 31 bbl. of oil a day through ¼-in. choke. Tests in the Travis Peak, main pay for the field, at 6,070-80 ft. were dry.

Link Well May Join Two Galveston County Fields

Joining of the Gillock and the Galveston (Big Gas Sand) fields in Galveston County appears likely following the completion by John W. Mecom of a good producer about midway in the 1¾-mile gap between the two fields.

The new well, 9-B Maco Stewart, 3½ miles south of Dickinson, flowed 233 bbl. of 33°-gravity oil daily through 12/64-in. choke from casing perforations at 8,910-20 ft. It is approximately 4,300 ft. southeast of the nearest Gillock well, which produces oil from 8,834-42 ft., and about 4,850 ft. northwest of the nearest Galveston field well, which produces oil from 8,780-84 ft. It was drilled to 9,676 ft. before running casing and completing.

MISSISSIPPI

Maxie Extension Well Opens Tuscaloosa Pay

Increasing importance is being attached to the comparatively new Maxie field, in southern Forrest County, following completion tests by Ohio Oil Co. at its 1-T Unit SW-31 which definitely established sizable gas-condensate production in the lower Tuscaloosa sand.

The well, 1½ miles southwest of the field's two previously completed wells, both in the shallower Eutaw sand, flowed at the rate of 10,000,000 cu. ft. of gas with 236 bbl. of condensate per day on tests through ½-in. choke. On a 4-hour gage through ⅜-in. choke, it flowed at the rate of 8,000,000 cu. ft. of gas with 192 bbl. of condensate per day with pressure of 2,635 psi. on the tubing and 3,023 psi. on the casing.

Pay is open through casing perforations at 8,356-75 ft. Casing had been run through the pay to 8,570 ft. in hole drilled to 8,650 ft.

The lower Tuscaloosa sand also is being found productive in the south offset to the field's Eutaw discovery well (Ohio Oil Co. 1 Coleman & Powe). The offset, The Texas Co. 1 Newton et al, ran slightly higher than the discovery well but was reported to have encountered poor sand conditions in the Eutaw. Drilled to 8,399 ft. in the lower Tuscaloosa, it has casing run to bottom. Pipe has been perforated opposite the deeper zone, and on a 3-hour test through 7/32-in. choke, the well flowed at the rate of 2,860,000 cu. ft. of gas with 120 bbl. of condensate per day, recording 2,800 psi. pressure on the tubing. During a 2-hour test through ¼-in. choke, the flow was at the rate of 4,885,000 cu. ft. of gas per day with 139.52 bbl. of condensate. Testing continues.

In the meantime, locations have been made for two more Tuscaloosa tests in the field, one by Ohio Oil Co. and the other by The Texas Co.

APPALACHIAN AREA

OHIO

Roy Daubenspeck et al completed a fair well in Brinkhaven pool on 3 Blubaugh, Section 1, Union Township, Knox County. Clinton sand at 2,885-2,934 ft. made 45 bbl. and an estimated 200,000 cu. ft. of gas in 24 hours after shot.

In Mt. Zion pool in Jackson Township, Knox County, the National Gas 1 W. R. Jewell, Section 25, logged the Clinton at 2,837-2,890 ft. with an oil showing that increased to 156 bbl. daily after Stratofrac.

The Oriskany sand in the southern part of Richfield Township, Summit County, has been getting a play. The Wiser Oil 2 Egbert, Lot 8, gaged 300,000 cu. ft. natural and 600,000 cu. ft. after acidizing from sand at 2,176-2,223 ft.

After several attempts to establish a pool at Metham in Bethlehem Township, Coshocton County, James I. Shearer et al. completed a fairly good well at 1 A. & N. Sherrets, second quarter. The Clinton, at 3,313-73 ft. made a good showing natural, and 108 bbl. daily after hydraulic fracturing.

Fairfield Shares Drilling Co. offset an old wildcat test on 1 Jesse M. Fink, Lot 5, Hopewell Township, Muskingum County, to the east and found a fair well on the 3 Fink. Sand was logged at 3,400-23 ft. and made 40 bbl. in 24 hours after shot.

E. H. Everett 1 Westbrook, Lot 1, Hanover Township, Licking County, a west offset to the 2 McKnight, filled up 1,400 ft. from Clinton at 2,906-57 ft. and made 123 bbl. in 24 hours after shot.

A second well confirms a ½-mile north extension to New Castle pool. W. E. Shrider 1 William Johnson, second quarter, New Castle Township, Coshocton County, made 196 bbl. in 24 hours after hydraulically fracturing the Clinton, found at 3,022-47 ft.

PENNSYLVANIA—NEW YORK

Activity in the north-central Pennsylvania area continues to increase. Over 60 locations have been made in Benezette field.

Latest completion in the Benezette field is John Fox 1 K. Bartoletta. Open flow was gaged at 10 million cubic feet daily with 3,950 psi. rock pressure. Well is located 2 miles southwest of 1 William Woodring well and 2 miles northwest of the Charleroi Mountain Club wells. Oriskany top is 6,110 ft. from an elevation of 953 ft.

In Pine Township, Clearfield County, pipe has been run in New York State Natural Gas Co. 1 O. W. McNauld to a depth of 7,244 ft. and tailing-in operations will start this week. Also in Pine Township, several miles northeast of the McNauld, Manufacturers Light & Heat Co. is running pipe on 2 State of Pennsylvania (Tract C) at a depth of 7,148 ft. Both of these tests are being closely watched by operators in the area.

Deep Rock 1 Walizer, located in Greene Township, Clinton County, has been completed dry in the Cambrian at a depth of 4,532 ft. Test had no reported shows of gas or oil.

New York State Natural has completed its 1 Edward G. Kesselring in Van Etten Township, Chemung County, New York, after hole filled up with over 8,000 ft. of salt water. Salt water was reportedly found in a Cambrian sandstone at 11,118-45 ft. Indicated porosity is viewed with optimism and will probably lead to further testing of deep formations. No Cambrian production has been found in the Pennsylvania-New York area.

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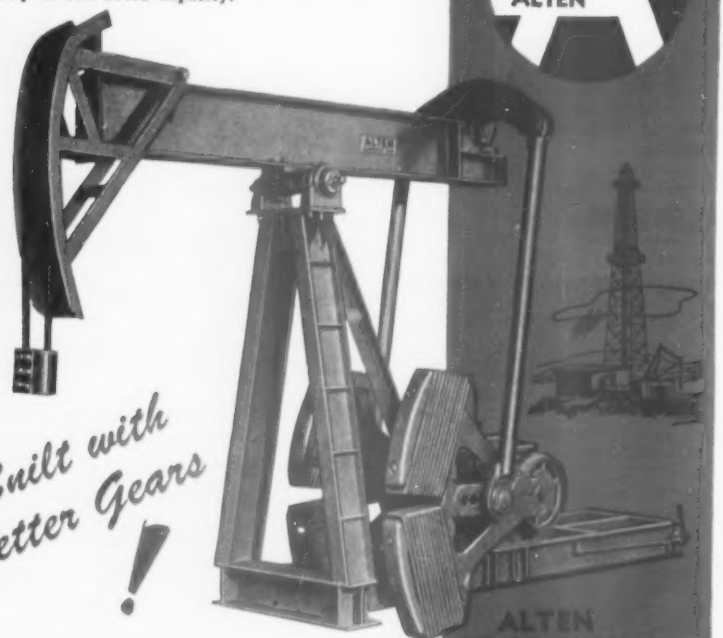

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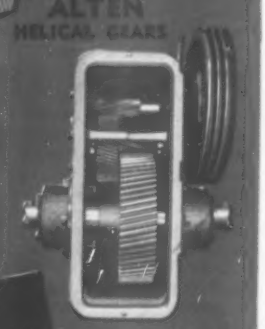

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UTAH

Wasatch Production Found At Peters Point Wildcat

El Paso Natural Gas Co. is reported coring below 3,182 ft. at 2 unit, SW NE SW 36-12s-16e, in the Peters Point area of Carbon County after testing gas at a rate in excess of 2 million cubic feet per day from upper Wasatch sands. Test was of the interval 2,846-2,900 ft. and the flow increased steadily over a 5-hour testing period, with flooding pressure ranging from 300 to 480 psi.

The wildcat is on lands farmed out to this operator by Cities Service Oil Co., unit operator. Cities Service drilled a failure in the unit during 1952 which reported noncommercial shows of gas in Wasatch. The wildcat is about 60 miles east of Clear Creek gas field in Carbon County, where production is from Ferron sand. Wasatch has not been a producing formation of importance in the Uinta basin basin.

New Pool at East Poplar

Empire State Oil Co. has recovered oil in commercial quantities from both the B-1 and B-2 zones of the Madison lime at 1 Smith, S½ SW SE 8-29n-51e, apparent new pool opener 2 miles north of existing production in the East Poplar area of Roosevelt County. A test at 5,748-64 ft. recovered 3,900 ft. of clean oil and 214 ft. of oil-cut mud. Flowing pressure was 250-1,500 psi., and the oil was 43°-gravity. Tool was open 4 hours on the test. A later test from 5,765-75 ft. flowed 41.6°-gravity oil after 2 hours and 25 minutes at a rate not disclosed by the operator. There was gas at the surface after 30 minutes of the 3 hour and 20 minute test.

East Poplar field is the most highly developed producing area discovered in the eastern Montana portion of the Williston basin since the current program began. During April 1953 an average of 17 producing wells in the field made 2,696 bbl. per day. Two separate pools have previously been discovered in the area, and the current apparent discovery is reported lower structurally than previous producers in the field.

Locations for Williston

Locations for two important wildcats on the western flank of the Williston basin have been made in Phillips and McCone counties, Montana. Gulf Oil Corp. will drill 1 State, C SW SW 31-37n-34e, in northern Phillips County, just 5 miles south of the Canadian border. The well is in the Frenchman's Creek area, and will test Ordovician at about 7,150 ft. There has been no drilling in this immediate area since discovery of oil in the Williston basin.

In northeastern McCone County's Sunnyside area, Continental Oil Co., Delhi Oil Corp,. and Montana-Dakota Oil Co. will test Ordovician at about 9,500 ft. at 1 Good, C NE SE 21-26n-49e, about 13 miles southeast of Wolf Point, where Continental has an unconfirmed discovery in 1952.

WYOMING

Big Horn Test Has Shows

South of the Manderson unit in Big Horn County, L. J. Peterson is coring ahead below 5,810 ft. at 1 Government, C SW NE 2-49n-92w, after recovery of about 31 ft. of core with good gas and oil shows in the interval 5,760-5,811 ft.

This wildcat is 3 miles southeast of the discovery in the Manderson unit, and about 1¾ miles southeast of a recent South Manderson discovery outside the unit area by Gulf Oil Corp. The area has been one of the most active in the Big Horn basin since development got under way in mid-1952. Discovery of oil on the structure was made in 1951 by General Petroleum Corp., but development was delayed pending unitization. Completions in the unit have been made for potentials in the range of 500-1,000 bbl. per day.

Fremont Wildcat Recovers Oil

Sinclair Oil & Gas Co. and Stanolind Oil & Gas Co. recovered 2,350 ft. of 40°-gravity oil on 53-minute test of Tensleep at 10,378-10,818 ft. at 1 unit, SW SE SW 21-33n-95w, in the North Sand Draw area of Fremont County. The wildcat went to a total depth of 11,500 ft. and reported shows of possible commercial value during drilling of the Tensleep. The present test apparently established the well as a discovery in this formation. The operators will proceed with further testing of the Tensleep zone before attempting completion.

COLORADO

Two Logan County Gas Discoveries Completed

Roden, Darden & McRae & Balderson, Denver independent operators have completed two gas discoveries in Logan County, with both wells now shut in for lack of market. At 1 Monroe, NE NE NE 11-10n-54w, discovery well in Little Hoot field, the operators reported an estimated potential of 5 million cubic feet of gas daily from "D" sand, topped at 4,976 ft. At 1 Haywood, SW SE SE 6-11n-54w, Casement field discovery, the reported potential was 4 million cubic feet daily, also from "D" sand. The pair of discoveries are regarded as significant additions to the growing gas availability of the Denver-Julesburg basin where market conditions have done little to encourage exploration for and development of gas production.

New Pay at Little Beaver

Forest Oil Co.'s discovery well in "J" sand in the north Little Beaver area Adams County, has been completed for a flow of 262 bbls. of oil daily. The well, 2 State-Hough, SW SE NW 26-1s-57w, produced through ½-in. choke from the "J" sand interval 6,291½-94 and 5,269-79 ft.

MICHIGAN

Total Activity Now Greater Than at Same Time Last Year

Although the Michigan Department of Conservation issued the largest drilling permit list of the year during the week of May 9 to 15, Michigan activity during the past 2 weeks has been suffering from the lack of new drilling starts earlier in the year. In the past 2 weeks there have been only 21 final completions. Of this number, 7 were wildcats, all dry, and 14 were field wells, of which only 6 were rated as oil wells and the balance were failures. However, the drilling pace in the state was increased during the current period with the approval of 29 new starts—which, for the first time in 1953, boosted the number of state-approved drilling wells to a total higher than recorded for the comparable period in 1952.

Total number of permits written to date in 1953 was 256 as of May 15, while to May 16, 1952, a total of 253 drilling permits had been written. Of the 256 currently issued drilling permits, only 89 were classified as wildcat oil and/or gas tests, while of the 253 permits written to the same date in 1952, 106 were classified as wildcats.

During the current period three Michigan wildcats were reported to be showing oil or gas in objective pay horizons, but none of these, on the basis of preliminary reports, appeared to be too significant.

In Oakland County, the Wm. J. Morriss 1 Smith, NE NW SW 15-1n-7e, was shut down for orders at 550 ft., after logging a show of oil, gas and water at 520 ft.

In Otsego County, Sun Oil Co. reported a show of gas in the Antrim shale at 1,576 ft. at its 1 Kneeland-Bigelow trustee, NW NW NW 9-29n-4w, but wildcat was being drilled ahead to test the Traverse lime.

The Orville Palmer 1 Rosenvear, SW SE SW 10-1s-15w, Van Buren County wildcat, was under test in the Traverse lime at 1,168 ft., lime contact point, with 400 ft. of fluid, oil and water showing natural.

KENTUCKY

EASTERN KENTUCKY

In Bell County 19-E-72, North American Petroleum Co., has a dry hole at 2 R. E. Viall. This wildcat, located 12 miles northeast of Pineville, topped the Maxon sand at 3,005 ft., Big Lime at 3,140 ft., and Corniferous at 4,115 ft. Total depth of hole was 4,201 ft. and while the well had shows of gas they were not commercial.

In Pike County, located on Shelby Creek in Big Sandy gas field, Kentucky-West Virginia Gas Co. have a good natural well at their 6,100 Wayne Johnson. At a depth of 2,770 ft. well had an official open flow potential of 2,373,000 cu. ft. of gas daily from the Big Lime, topped at 2,350 ft. A 12-hour rock pressure test showed 635 psi.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

Atascosa County: J. D. Hedley & Hart Oil Co., Ltd., 1 Tom, W. E. Tom Brothers Sur. 13, A-1185. Dry. TD 6,606 ft.

J. C. McCabe et al 1 Mann, William W. Wilkinson Sur. 1397, A-890. Dry. 1,756 ft.

Bastrop County: Mrs. Nila Runder 1 J. A. Smith, Jr., I. Casner Sur. Dry. TD 1,805 ft.

Dimmitt County: Henderson Coquat 2-A Dillon, Catarina Farms. Dry. TD 5,387 ft.

Duval County: J. P. Bristow 1-D W. R. Peters est., T. A. Cavitt Sur. 34, A-1704. Dry. TD 3,200 ft.

John F. Camp 4 Miller, Diego Hinojosa Grant. Dry. TD 3,790 ft.

Frio County: Henry Slavik 1 Walker, J. W. Slaughter Sur. 1151, A-833. Dry. TD 3,682 ft.

Gonzales County: Sutton Drilling Co. 1 Henderson, L. Mallett Sur., A-352. Dry. TD 2,375 ft.

Jim Hogg County: American Republics Corp. 1 Mestina, Jose Marcelo Hinohosa Grant. Dry. TD 6,018 ft.

Chisum, Rhodes & Hicks 1 Eduardo Yzaguirre, Jr., Agua Nueva de Abajo Grant. Dry. TD 4,261 ft.

Humble Oil & Refining Co. 2-B Atwood, San Antonio Viejo Grant, A-327. Dry. TD 5,000 ft.

Harry B. Williams 1 W. A. Dannalley et al, J. F. Rumsey Sur., A-272. Dry. TD 2,940 ft.

Nueces County: Southern Minerals Corp. 1 Luby, Mary Luby Patronilla Ranch. Dry. TD 8,430 ft.

Louis H. Weltman and Texita Oil Co. 1 Kleberg, Partition of Wright Lands. Dry. TD 7,520 ft.

San Patricio County: La Gloria Corp. 1-A R. H. Welder, Welder Ranch Subd. Dry. TD 9,201 ft.

Webb County: Sid Katz & Rowden 1 Withers, AB & M Su. 32. Dry. TD 1,769 ft.

Wilson County: Southern Mineral Corp. 5 Manford, John F. Rodriguez Sur. Dry. TD 5,107 ft.

*Zapata County: Delhi Oil Corp. 2 Ildefonso Ramirez, Procion 18, Certificate 6590. IP 1,760 M.c.f. daily, open flow, Wilcox 9,607-20 ft. (casing perforations). TD 9,787 ft.

EAST TEXAS

*Harrison County: Warren Petroleum Corp. 1 J. E. McFarland, David Hill Sur., 3½ mi. NE Longview. IP 8,650 M.f.g., plus 12 bbl. distillate per 1,000 M.f.g., Young zone 6,993-98 ft. TD 7,017 ft.

Hunt County: Empire Oil & Refining Co. 1 Walter Graner, James Hamilton Sur., A-517. Dry. TD 3,171 ft.

B. L. Hoover 1 Maud Burnett, C. A. Warfield Sur. Dry. TD 3,214 ft., elev. 503 ft., Woodbine 2,601 ft.

Navarro County: Bristle Importing Co. 1 Roy Graham, John Stroder Sur., A-788. Dry. TD 1,764 ft.

Wood County: Rancho Oil Co. 1 J. H. Ziegler, J. B. Gant Sur., A-239. Dry. TD 7,192 ft., Austin chalk 5,841 ft.

TEXAS GULF COAST

Brazoria County: Gulf Oil Corp. 1 Jones Creek Gas Unit 1, S. F. Austin 7½ Lge., A-20. Dry. TD 12,270 ft.

Phillips Petroleum Co. 2-V Houston, Perry & Austin Sur., A-109. Dry. TD 12,560 ft.

Colorado County: R. N. Ranger and R. W. Fair 1 Beane, I&GN Sur., A-637. Dry. TD 10,507 ft.

*Fayette County: Hamman Oil & Refining Co. and States Marine Corp. 1-A Armin et al, William Kuykendall ⅓ Lge., A-219. IPP 10.34 BOPD, 21.5°, open hole 2,076-83 ft. TD 2,083 ft. (Extends West Muldoon field.)

Fort Bend County: Pat O. Humphreys 1 Cooper, Randolph Foster Lge., A-28. Dry. TD 7,200 ft.

Mac Drilling Co. and King & Heyne 1 McHard et al, Moses Merritt Sur., A-285. TD 8,310 ft.

Goliad County: 3rd M. E. Abdrews, Ltd., and Dallas Husky 1 Fromme, Samuel Barton Sur., A-60. Dry. TD 3,127 ft.

Hardin County: Michel T. Halbouty 1 Kirby, Ignacio Villegas Sur. Dry. TD 9,872 ft.

Harris County: R. E. Hibbert 2 J. C. Bauer, WC&R Sur. 13, A-915. Dry. TD 8,012 ft.

*Jackson County: N. B. Hunt 1 Mulholland et al, John M. White Sur., A-268. IP 66,000 M.c.f. daily, Frio 3,722-26 ft. (casing perforations). TD 5,255 ft. (New field.)

Karnes County: Bridwell Oil Co. 1 Stanfield, B. Hickman Sur., A-35. Dry. TD 4,366 ft.

Sunray Oil Corp. 1 Monroe Schmidt, Carlos Martinez Grant. Dry. TD 7,503 ft.

*Liberty County: John W. Mecom 4-A Seaberg, H&TC Sur. 120. IP 103 BOPD, 10/64-in. 24-2°, casing perforations 4,018-

WILDCAT COMPLETIONS

32 ft. TD 4,516 ft. (New pay in North Dayton field.)

Live Oak County: George S. Hammond 1 Hinton, Thomas Henry Sur., A-14. Dry. TD 2,005 ft.

Matagorda County: Edwin L. Cox 1 Elken, W. A. Hurd Lge., A-196. Dry. TD 8,523 ft.

Victoria County: W. H. Cocke and R. H. Goodrich 1 McCormick et al, SA&MG Sur., A-314. Dry. TD 1,000 ft.

*Arnold O. Morgan 1-A R. H. Welder, SA&MG Sur., Section 10, A-331. IP 4,200 M.c.f. daily, open flow, and 37 BC per million, Wilcox 8,710-15 ft. (casing perforations). TD 8,806 ft. (New field.)

Wharton County: J. K. Dorrance et al 1 Christensen, A. T. Smith Sur. 98, A-551. Dry. TD 7,705 ft.

WEST CENTRAL TEXAS

Brown County: Central Texas Gas Co. 1 J. Elwood Brewer, Blk. 27, HT&B. Dry. TD 1,176 ft.

*Chas. Rupe Drilling Co. 1 Byler, Sec. 43, T&NO. IPP 16 BOPD, 40°, pay 1,264-80 ft. TD 1,325 ft.

Gilchrist Drilling Co. 1 C. T. Moore, Jessie Williams Sur. 144. Dry. TD 2,290 ft.

*C. T. Grubbs 1 B. Hickman, W. S. Johnson Sur. IPPP 15 BOPD, 42°, sand 1,293-1,331 ft. TD 1,334 ft.

Callahan County: Allen Dykes 1-A Katie Dugan, Sec. 84, BBB&C. Dry. TD 4,634 ft.

Intex Oil Co. 1 Elma Jackson, 96-12-T&P. Dry. TD 3,221 ft.

West Central Drilling Co. 1 D. E. Allen, Sec. 81, BBB&C. Dry. TD 3,258 ft.

Coleman County: Oil Hunters, Inc. 1 Griffin Heirs, Blk. 3, Sur. 95, A-557. Dry. TD 1,200 ft.

Westates Petroleum Corp. 1 G. W. Fonder, Sec. 112, W. H. Bynum Sur. 272. Dry. TD 1,989 ft.

*Western Petroleum Co. and Yeatman 1 Hubert Stokes, Sec. 4, J. W. Robinson Sur. IP 127 BOPD, 42°, pay 3,494 ft. TD 3,558 ft.

Eastland County: James L. Anderson 1 Mulley, Lot 9, Richardson Sur. Dry. TD 3,100 ft.

*G. B. Butterfield 1 Johnny Aaron, 4-3-H&TC. IP 166 BOPD, 20/64-in., 42°, pay 3,502-12 ft. TD 3,615 ft.

Walter Lown 1 M. M. Watkins, 11-3-BBB&C. Dry. TD 1,055 ft.

*Fisher County: British American Oil Co. 2 Mose Newman, 8-20-T&P. IPP 63 BOPD, 43°, pay 5,997 ft. TD 6,035 ft.

R & R Drilling Co. 1 W. F. Martin, 113-1-H&TC. Dry. TD 5,610 ft.

Haskell County: E. K. and E. M. Burt 2-19 Swenson Land & Cattle Co., 19-1-BBB&C. Dry. TD 3,101 ft.

S. C. Herring 1 Charles Grissom, McHenry Windburn Sur., 121. Dry. TD 5,675 ft., Caddo 5,355 ft.

Jones County: Robert M. Bass 1 J. B. Hay, S. M. Hale Sur. 251. Dry. TD 2,809 ft.

Humble Oil & Refining Co. 1 W. M. Cowsert, Sec. 13, Orphan Asylum Lands. Dry. TD. 4,625 ft.

Neeld & Hood Drilling Co. 1-B Culbertson, Sec. 5, GH&H. Dry. TD 3,412 ft.

The Texas Co. 1-A Bartlett, 1-9-J. A. Allcorn Sur. Dry. TD 2,238 ft.

*Nolan County: Stanolind Oil & Gas Co. 1-E TXL, 15-Z-T&P. IPP 177 BOPD, 43°, pay 4,084-99 ft. TD 6,532 ft.

*Shackelford County: Harry Hines 1 J. H. Nail, Sec. 138, ETRR. IP 25.8 BOPD, pay 1,623 ft. TD 1,635 ft.

*M. J. Mitchell 1 Frank Burchard, Sec. 18, Orphan Asylum Lands. IP 273 BOPD, 48°, ⅛-in., pay 4,218 ft. TD 4,227 ft.

B. F. Weekley 1 B. F. Weekley, 6-12-T&P. Dry. TD 1,730 ft.

Stonewall County: R & R Drilling Co. and Sid Katz 1 Mrs. W. A. Springer, 100-D-H&TC. TD 6,210 ft., elev. 1,736 ft., Caddo 6,057 ft., Mississippian 6,206 ft.

Taylor County: Bert Fields 1 Jesse Brown, 36-17-T&P. Dry. TD 3,409 ft.

Sojourner Drilling Co. 1 Robert Malone, 1-18-T&P. Dry. TD 3,655 ft.

NORTH TEXAS

Archer County: Darden & Terry 1 Jack Marvin-Bloodworth, 12-A936-BBB&C. Dry. TO 1,303 ft.

*Ralph O. Harvey, Jr. 1 Henry Harrison, TE&L Sur., A-529. IPP 156 BOPD, 46°, pay 3,289 ft. TD 3,750 ft.

Haynes & Breeden 1 W. A. Liles, M. Calan Sur., A-137. Dry. TD 801 ft.

Fortex Oil Co. 1-B Ferguson, SPRR Sur., A-968. Dry. TD 1,780 ft.

Clay County: L. T. Burns 1 B. C. Davenport, T&NO Sur. 11, A-664. Dry. TD 6,625 ft.

Grayson County: S. A. Winfrey 1 A. C. Cheatham, Sarah Cross Sur., A-210. Dry. TD 4,039 ft.

*Jack County: Hale Bros. 1 C. E. Rogers, P. J. Simms Sur., A-2133. IP 64 BOPD, 42°, 8/64-in., pay 5,065 ft. TD 5,267 ft.

Neeld & Hood Drilling Co. 2 S. E. Maxey, SPRR Sur., A-568. Dry. TD 3,700 ft.

*Knox County: Sid Katz 1 Alexander Trust, 31-3-D&W. IP 195 BOPD, 42°, 16/64-in., Caddo pay 6,275 ft., TD 6,283 ft.

Montague County: J. C. Jennings 1 Paul Holbrook, W. C. Frasher Sur., A-1082. Dry. TD 6,285 ft.

Miami Operating Co. 1 L. W. Van Bacter, 2814-A749-TE&L. Dry. TD 6,802 ft.

Wilbarger County: F. J. Pounds 1-I Waggoner, 5-17-H&TC. Dry. TD 2,264 ft.

This announcement is not an offer of securities for sale or a solicitation of an offer to buy securities.

May 14, 1953

1,833,009 Shares

Texas Eastern Production Corporation

Common Stock

Par Value $5 per Share

The Company has issued transferable warrants, expiring May 27, 1953, to holders of common stock of TEXAS EASTERN TRANSMISSION CORPORATION, evidencing primary rights to subscribe for these shares at the rate of 1 share of Common Stock of the Company for each 3 shares of common stock of TEXAS EASTERN TRANSMISSION CORPORATION held, with additional rights to subscribe subject to allotment for shares not taken under the primary rights, all as more fully set forth in the prospectus.

Subscription Price to Warrant Holders $10 per Share

Dillon, Read & Co. Inc. has entered into an agreement with the Company to act as Dealer Manager in forming a group of Soliciting Dealers for the purpose of soliciting the exercise of warrants.

Copies of the prospectus may be obtained from such of the undersigned as may be qualified to solicit subscriptions under applicable securities laws.

The Soliciting Dealers include:

Dillon, Read & Co. Inc.
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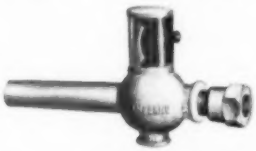

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INFERNO

WILDCAT COMPLETIONS

Frank Wood 1 W. T. Waggoner "Robin," 44-4-H&TC. Dry. TD 2,003 ft.

Young County: Bridwell Oil Co. 1 Prideaux-Sams, 27-A1284-Young CSL. Dry. TD 3,680 ft.

C. B. Christie 1 George Garrett, Young CSL. TD 3,652 ft.

S. D. Johnson 1 M. Brasheara, E. Douglas Sur., A-2156. Dry. TD 5,247 ft.

G. E. Kadane & Sons 1 L. T. Richardson, J. G. Maupin Sur., A-1483. Dry. TD 3,720 ft.

Meredith Drilling Co. 1 J. T. Hutchings, Blk. 232, TE&L Sur. Dry. TD 1,032 ft.

WEST TEXAS

*Andrews County: Phillips Petroleum Co. 1-RR University, 42-5-University. IP 1,259 BOPD, ¼-in., 44°, Ellenburger 13,848 ft.; IP 384 BOPD, ½-in., 41°, Devonian 12,530-12,590 ft., elev. 3,051 ft., TD 13,853 ft.

*Lubbock Machine & Supply Co. 1 Logan & Parker, 14-A46-PSL. IPP 164 BOPD, pay 4,482 ft., TD 4,659 ft.

Borden County: Brinkerhoff Drilling Co., 1 A. M. Clayton, 48-32-T4N-T&P. Dry. TD 8,070 ft., elev. 2,446 ft., reef 8,045 ft.

*Conchoe County: Amerada Petroleum Corp. 1 Sarah Whitfield, F&M Sur. 2769. IPP 7 BOPD, 43°, pay 1,660-90 ft. TD 3,080 ft.

James K. Anderson 2 Wilson, 76-8-H&TC. Dry. TD 1,392 ft.

*Crockett County: Haynes and V. T. Drilling Co. 1 University, 4-50-University. IP 72 BOPD, pay 2,295 ft. TD 2,347 ft.

A. R. McElreath 1 E. F. Noelke, 47-31-H&TC. Dry. TD 1,425 ft.

McElroy Ranch Co. 1 H. B. Cox, E. Ruiz Sur. 4. Dry. TD 7,450 ft., elev. 2,125 ft., Ellenburger 7,114 ft.

D. D. Thomas 1 Mrs. Alfred E. Luckett, 62-GH-GC&SF. Dry. TD 1,465 ft.

Dickens County: Skelly Oil Co. 1 MP-S. M. Swenson, 162-1-H&GN. Dry. TD 7,502 ft., elev. 2,223 ft., Ellenburger 7,476 ft.

Gaines County: The Texas Co. 1 Tobe Foster, 3-3-5-Dawson CSL. Dry. TD 9,510 ft., elev. 3,241 ft., Wolfcamp 9,334 ft.

Garza County: Duncan Drilling Co. 1 Kirkpatrick, 1-2-GH&H. Dry. TD 2,940 ft.

Honolulu Oil Corp. 1 S. D. Simms "A," Sec. 1208, H&OB. Dry. TD 4,200 ft.

*Howard County: Stanolind Oil & Gas Co. 1 Minnie Sm[illegible], 45-31-T3N-T&P. IPP 28 BOPD, 40°, reef pay 7,773 ft. TD 7,851 ft.

Kent County: Sunray Oil Corp. 1-56 W. A. Mays, 56-4-H&GN. Dry. TD 7,211 ft., elev. 2,039 ft., Mississippian 7,175 ft.

R. A. Welch 1 T. O. Sorelle, 399-2-H&TC. Dry. TD 7,125 ft.

Martin County: Brown & Wheeler 1 H. P. Morrison, 28-36-T1S-T&P. Dry. TD 4,043 ft.

Menard County: Wayne Allison 1 Katherine Ball, 20-A-GH&SA. Dry. TD 196 ft.

*Mitchell County: R. L. Wood 1 Ross Dixon, 2-12-H&TC. IP 45 BOPD, 44°, ½-in., Strawn sand 6,232 ft., TD 6,400 ft.

Pecos County: Fason & Lee, Inc., 1 Jennie Scherff, 30-3-H&TC. Dry. TD 2,080 ft.

R. H. Henderson 1-A Hines, 11-112-TCRR. Dry. TD 3,612 ft.

Runnels County: Allen J. Dykes 1 Carrie A. Jeffreys, Sec. 131, ETRR. Dry. TD 3,762 ft.

*Henson Drilling Co. 1 Johnson, Sec. 177, H&TB. IP 191 BOPD, 40°, 32/64-in. pay 3,596-3,602 ft. TD 3,769 ft.

Upton County: Cities Service Oil Co. 1 University, "AS," 8-14-University. Dry. TD 7,166 ft., elev. 2,449 ft., Devonian 6,512 ft., Silurian 6,742 ft.

SECONDARY RECOVERY MODERN

TECHNICAL CONSULTING PRODUCTION ENGINEERING SERVICE INCLUDING CORE ANALYSIS

PRESSURE MAINTENANCE WITH GAS OR WATER

REPRESSURING WITH GAS OR WATER

Salt Water Filter for Strawn Sand Pressure Maintenance

Archer County, Texas

SURVEYS
ESTIMATES
DESIGN
INSTALLATION
SUPERVISION

PETROLEUM ENGINEERS
CABLE ENGINEERING
WICHITA FALLS, TEXAS

CIC COMMONWEALTH INVESTMENT COMPANY

A MUTUAL INVESTMENT FUND

COMMONWEALTH INVESTMENT COMPANY

ESTABLISHED 1932

Prospectus describing Company and terms of offering may be obtained from Investment Dealers or 2596 Russ Building, San Francisco 4, California.

Gentlemen:
Am interested in receiving information on Commonwealth Investment Company. Will you please send me a copy of the Prospectus.

Name _____

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ONAN Oilfield
Electric Plants

CK MODELS
3,500 watts A.C.
5,000 watts D.C.

HEAVY-DUTY PORTABLE & STATIONARY MODELS
Diesel, Gas, Gasoline-powered

ONAN oilfield electric plants provide dependable light and power for any application. A complete range of A.C. and D.C. models . . . all conservatively rated for continuous dependable service, helps you choose the right plant for the job. Lightweight, air-cooled models from 400 to 10,000 watts; heavy-duty, water-cooled, gasoline-driven plants from 5,000 to 35,000 watts. Air-cooled Diesel electric plants 3,000 and 5,000 watts. Water-cooled Diesels to 55,000 watts.

Write for specifications

D. W. ONAN & SONS INC.
7552 Univ. Ave. S.E., Minneapolis 14, Minn.

BUSINESS and Pleasure in TULSA means-

- AIR-CONDITIONED COMFORT
- CENTRAL LOCATION
- CONVENIENT COFFEE SHOP
- NEW MODERN ADJOINING GARAGE

THE MAYO
TULSA'S *FINEST* HOTEL
Home of the Popular Terrace Room

WILDCAT COMPLETIONS

Oliver & Kotoyza 1-B Carney, 2-1-MK&T. Dry. TD 2,031 ft.

*Ward County: Argo Oil Corp. 1 John Olson, 191-34-H&TC. IP 42 BOPD, ¾-in., 38°, pay 4,934 ft. TD 5,132 ft.

*Yoakum County: H. L. Lowe 1-L Webb, 477-D-J. H. Gibson Sur. IPP 24.8 BOPD, pay 5,314 ft. TD 5,318 ft.

*Cabot Carbon Co. 7 Johnnie E. Wright, 13-D-John H. Gibson Sur. IPP 168 BOPD, 29°, pay 6,435 ft. TD 9,010 ft.

SOUTHEAST NEW MEXICO

Chaves County: Kewanee Oil Co. 1 Four-Mile Unit, 26-18s-18e. Dry. TD 6,562 ft., elev. 5,180 ft., Glorietta 880 ft., Drinkard 2,340 ft., Pennsylvanian 4,940 ft., Mississippian 6,110 ft., Fusselman 6,538 ft.

Kerr-McGee Oil Industries 1 State, 32-13s-39e. Dry. TD 10,693 ft., elev. 3,680 ft., Mississippian 9,050 ft., Devonian 9,650 ft., Ellenburger 10,339 ft.

Kerr-McGee Industries 1-A State, 32-13s-39e. Dry. TD 1,501 ft.

*Lea County: Morrie E. Antwell 1 Phillips-Hooper, 27-20s-37e. IP 4,507 M.f.g., Queen sand 3,502 ft. TD 3,828 ft.

Carper Drilling Co. 1-A Carper-Stanolind-State, 11-19s-36e. Dry. TD 4,690 ft.

Superior Oil Co. 1-23 State-Nix, 23-22s-35e. Dry. TD 4,395 ft.

ILLINOIS

Edwards County: Herndon Drilling Co. 1 Collins, SW SW SW 2-2s-10e. Dry. TD 3,361 ft.

Zanetis Oil Co. 1 Sutton, SE NW SW 33-2s-10e. Dry. TD 3,360 ft.

Montgomery County: E. L. Wirth 1 McNaughton, NW NW NW 14-10n-4w. Dry. TD 640 ft.

*Wayne County: Nash Redwine 1 Felix, SW NW SE 6-3s-9e. IPP 66 BOPD, Aux Vases sand 3,352-59 ft. TD 3,411 ft. Extension to Goldengate pool.

INDIANA

Knox County: C. E. O'Neal 1 Whitelock, NW SW SE 6-1s-8w. Dry. TD 1,625 ft.

Perry County: M. R. M. Coal & Oil Co. 1 Sturgeon-Hudson, N½ NW NW 12-4s-3w. Dry. TD 601 ft.

Posey County: Coy Oil Co. 1 Schmidt Commission, SW SW NW 41-4s-13w. Dry. TD 2,993 ft.

*Spencer County: John Tuttle 1 Lehr, NE NE NE 16-7s-6w. IPP 14 BOPD, McClosky 1,452-57 ft., TD 1,457 ft. New pay and extension, Rock Hill South pool.

J. M. Haynes 1 Miller, SE NE SE 28-6s-6w. Dry. TD 1,041 ft.

Vigo County: Kuhn-Bayer Petroleum Co. 2 Johnson, SE SE NW 31-10n-8w. Dry. TD 2,110 ft.

KENTUCKY

Hancock County: G. C. Schoonmaker 1 Mary Givens, NW NE SE 22-R-31. Dry. TD 1,187 ft.

Union County: Delta Drilling Co. 1 Drury, NE SW NW 17-P-19. Dry. TD 3,000 ft.

MICHIGAN

Bay County: Michigan Oil Co. and Basin Oil Co. and William B. Stewart 1 Schutt, SE SE NE 10-15n-3e. Dry. TD 3,231 ft. in Dundee.

Jackson County: Allied Investments, Inc. 1 McArthur, NE SW NW 14--1s-3w. Dry. TD 1,928 ft. in Traverse.

Muskegon County: Avalon Oil Co. 2 Lane, SW NW NE 4-10n-15e. Dry. TD 1,030 ft. in Ellsworth dolomite (so-called Berea).

Van Buren County: John D. S. Hanson 1 Komak, SE NW SW 29-3s-15w. Dry. TD 998 ft. in Traverse.

Wexford County: Sun Oil Co. 1 Ridgway, SE SE SE 13-21n-11w. Dry. TD 3,923 ft. in Dundee-Reed City one.

OHIO

Meigs County: Mealton & Perry 1 John Bowen, Sec. 23, Salem Township. Dry. TD 2,634 ft. in Ohio shale.

PENNSYLVANIA

Somerset County, Greenville Township: New York State Natural Gas Corp. 1-320 M. V. Newman, elev. 2,557 ft. Dry. TD 6,307 ft. Onondaga 5,520 ft. Chert 5,576 ft. Oriskany sand 5,624-5,784 ft. Salt water 5,730 ft.

ALABAMA

Escambia County: Sunnyland Co. 1 George, C NE NE 20-2n-8e. Dry. TD 6,276 ft. Elev. 321 ft., Wilcox 1,385 ft., Eutaw sand 4,776 ft., marine Tuscaloosa 5,591 ft., Pilot 5,800 ft., Massive 5,952 ft., lower Cretaceous 6,182 ft.

Sunnyland Contracting Co. 2 Adkinson, C SE NE 36-1n-11e. Dry. TD 6,306 ft. Elev. 213 ft., Eutaw 4,638 ft., marine Tuscaloosa 5,353 ft., Pilot sand 5,643 ft., Massive 5,750 ft., lower Cretaceous 5,974 ft.

MISSISSIPPI

Jefferson County: J. Paul Ratliff, Jr. 1 Groome, 32-8n-2e. Dry. TD 6,756 ft. Elev. 438 ft., Sparta 2,810 ft., Wilcox 4,119 ft., base big shale 5,535 ft., Artman 5,877 ft.

Sunnyland Contracting Co. 1 Mardis, 58-9n-13. Dry. TD 6,537 ft. Elev. 224 ft., Wilcox 3,759 ft., base big shale 5,124 ft.

Wilkinson County: Gulf Refining Co. 29 Crosby, 46-4n-2w. Dry. TD 7,280 ft. Elev. 243 ft., Vicksburg 3,063 ft., Cook Mountain 3,800 ft., Sparta 4,066 ft., Wilcox 5,181 ft., base Big Shale 6,416 ft., base Baker shale 6,920 ft.

NORTH LOUISIANA

Bossier Parish: Crow Drilling Co. 1 Annie O. Hughes, SW NW SW 8-21n-13w. Dry. TD 2,351 ft.

*DeSoto Parish: Midstates Oil Corp. 1 Frankie Pyle, 330 ft. N and E of SW corner 31-13n-16w. IPF 133 BOPD, 14/64-in., 39.5°, Hill sand (Rodessa), 5,192-5,210 ft. OTD 6,328 ft., PBTD 5,305 ft. (New pay in Logansport field.)

Madison Parish: John W. Olney et al 1 A. L. Sevier, 518 ft. N and 283 ft. W of SE corner NW SE 92-15n-13e. Dry. TD 5,154 ft. Midway 5,100 ft.

it's 500 in June FOR SSC
(See SSC's ad in the next issue)

WILDCAT COMPLETIONS

Sabine Parish: Carter Oil Co. 21 Louisiana Long Leaf Lumber Co., 520 ft. N and 330 ft. W of SE corner NE NE 32-7n-12w. Dry. TD 3,187 ft. Blossom 3,061 ft. (Core test.)

SOUTH LOUISIANA

Allen Parish: *Niloco Co. and Bell Oil Corp. 1 Edgewood, 19-6s-7w. IP 27 BCPD and 765 M.c.f. daily, 67.1°, 12/64-in., casing perforations 8,196-8,206 ft. TD 8,600 ft. (New field.)

Richardson & Bass 1 Shell-C. Meaux et al, 19-5s-3w (Southeast Oberlin area). Dry. TD 12,594 ft.

Calcasieu Parish: Kerr-McGee Oil Industries, Inc., 1 Brooks, 20-10s-12w (northwest flank Vinton dome). Dry. TD 11,766 ft.

East Baton Rouge Parish: *Atlantic Refining Co. 1-A Morgan, 53-7s-1e. IP 80 BOPD, 48°, ½-in., casing perforations 10,054-65 ft. TD 10,405 ft.

Jefferson Davis Parish: American Republics Corp. 1 Lock Moore & Co., Inc., 34-7s-6w. Dry. TD 9,500 ft.

Lafourche Parish: *E. J. Hudson 2 Green, 2-17s-22e. IP 284 BOPD, 31°, 11/64- in., casing perforations 10,356-68 ft. TD 11,315 ft.

ARKANSAS

Bradley County: McAlester Fuel Co. 1 Bradley Lumber Co. "A," SW NW SE 25-13s-10w. Dry. TD 3,740 ft. Smackover 3,625 ft.

OKLAHOMA

Atoka County: Sutherland-Piranio 1-B Ayers, SE SE SE NE 8-3s-9e. Dry. TD 932 ft.

*Beaver County: Carter Oil Co.-Stanolind Oil & Gas Co. 1 Kinnamon, C SE NE 23-5n-23eCM. IP 2,900 M.c.f. of gas per day, Morrow 6,484-6,510 ft. TD 7,081 ft.

*Cimarron County: Coltex Corp. 1 Purdy "B," NW SE 19-6n-9eCM. IP 13,700 M.c.f. of gas per day, 4,647-78 ft. TD 4,925 ft.

*Garvin County: Phillips Petroleum Co. 1 Arnesen, C NW SE 2-3n-4w. IPF 145 BOPD, 42.5°, Hart 8,650-8,738 ft., 150 BOPD, 36.3°, Springer 9,676-9,758 ft. TD 9,920 ft.

*Hughes County: Howard Hagan 1 Gilmore, SE SW SE 7-5n-9e. IPP 15 BOPD, 32°, upper Booch 2,586-2,712 ft. TD 2,761 ft.

Johnston County: Ross Sears 1 Spears, NE SW NW 26-1s-6e. Dry. TD 1,346 ft. Arbuckle.

Kay County: Hammer & McLean 1 Warren, NE NE SE 19-29n-4e. Dry. TD 3,214 ft.

*Lincoln County: Mohawk Drilling Co. 1 Annes Est., NE SE NE 24-13n-5e. IPF 48 BOPD, Prue sand 3,206-18 ft., 3,780 M.c.f. of gas daily. TD 4,560 ft.

Champlin Refining Co. 1 Wagner, NW NW SW 10-16n-4e. Dry. TD 4,619 ft.

D&L Oil Co. 1 Penrod, SW SW NW 30-16n-5e. Dry. TD 4,581 ft.

Paul R. Prentice 1 Burkhart, SE NW SE 35-16n-6e. Dry. TD 3,287 ft.

Logan County: Russell Maguire 1 Thedford, SE SE NE 11-19n-2w. Dry. TD 5,492 ft.

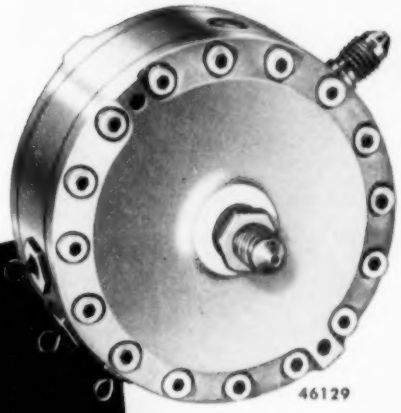
Love County: J. R. and Adam Seitz 1 Bond, NW SW NE 4-9s-2e. Dry. TD 5,069 ft. Hudspeth 4,378 ft.

McCurtain County: Frank Walters et al 1 Coyle, C SE NW 8-9s-24e. Dry. TD 2,412 ft.

Osage County: Parker Drilling Co. et al 1 Osage, SW SW NE 16-23n-6e. Dry. TD 3,126 ft.

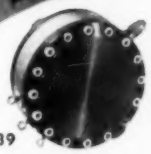
*Holbert & Evans 1 Osage, NE NE SW 21-25n-4e. IPP 30 BOPD, Cleveland 2,932-88 ft. TD 3,585 ft.

transmission of pressure information



Giannini
pressure transmitters
RESISTANCE TYPE
GAGE • ABSOLUTE • DIFFERENTIAL

ACCURATE
SMALL SIZE
RUGGED
LIGHTWEIGHT


46139

46118

46119

High Pressure Transmitters

Giannini pressure transmitters accurately translate pressure into proportional electrical signals of relatively high power—signals, that require little or no amplification for utilization. These high pressure transmitters incorporate a unique, direct-coupling arrangement between bourdon tube and potentiometer element which obtains movement amplification without the use of gearing or linkage, thus giving high sensitivity, repeatability, and low hysteresis. Specific models are available for operation under either normal or extreme conditions of vibration and acceleration.

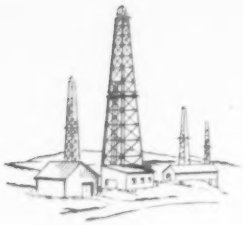
Models also available for low pressure and high altitude applications.

MODEL	WEIGHT	GAGE	ABSOLUTE	DIFFERENTIAL
* 46129	0.75 lbs.	0-100 psig up to 0-600 psig	15-100 psia up to 15-600 psia	0-100 psid up to 0-600 psid
46118	0.3 lbs.	0-100 psig up to 0-6500 psig	0-100 psia up to 0-500 psia	0-100 psid up to 0-600 psid
* 46119	0.6 lbs.	0-100 psig up to 0-6000 psig	0-100 psia to 0-600 psia	0-100 psid to 0-600 psid
46139	0.75 lbs.	0-100 psig up to 0-6500 psig	NONE	NONE

Standard Resistance 2,000 ohms. * For Corrosive Media.
For specific values of linearities, resolution, repeatability and hysteresis, write for bulletins.

Giannini INSTRUMENTS CONTROLS

G. M. GIANNINI & CO., INC. PASADENA 1, CALIF. EAST ORANGE, NEW JERSEY



LOWERS maintenance cost . . .
INCREASES production efficiency

Kennametal Balls and Seats last over 20 times longer than alloy steels* because of their high resistance to wear and ability to absorb great shock. Diamond-like hardness and great impact strength, which are most inherent in Kennametal sintered carbides, reduce costly string pulling to a minimum and provide steadier day-by-day oil production.

Sintered carbides of Kennametal provide long service life in pumping fluids with sand, water, sour crude, hydrogen sulphide cuts—and are dependable insurance in *any* well against string pulling due to faulty balls and seats.

Kennametal Balls and Seats can give you big savings in string-pulling costs, and higher production rates through more continuous pumping. They are standard equipment in most leading pumps. A complete line of Kennametal sintered carbide balls and seats (in both plain and rib types) is available in API sizes from suppliers everywhere.

**As proved by numerous comparative performance reports from both the West Coast and Mid-Continent Fields. Specific data furnished by writing manufacturer.*

KENNAMETAL
PUTS AN END TO DOWN-THE-HOLE VALVE CHECK TROUBLE

Quality Sintered Carbide API Balls and Seats

®

Manufactured by
Kennametal Inc., Latrobe, Pa.

SOLD BY YOUR REGULAR SUPPLIER

WILDCAT COMPLETIONS

Pawnee County: Davon Oil & Gas Co. 1 Heiman, SW SW NW 6-22n-5e. Abd. Temp. TD 4,150 ft.

KANSAS

*Barber County: Champlin Refining Co. 1 Nurse, NE NE NE 23-31s-13w. IP 4,300 M.c.f. of gas daily, Douglas sand 3,599-3,603 ft. TD 4,705 ft. (Opens Nurse pool.)

Butler County: Rex & Morris 1 Gilmer, SE SE SW 31-29s-5e. Dry. TD 2,847 ft.

*Cowley County: The Texas Co. 1 Jarvis, NW SW NW 33-31s-6e. IPP 39 BOPD, Layton 2,198-2,206 ft. TD 3,065 ft. (Opens Burden East pool.)

*Decatur County: Anderson-Prichard Oil Corp. 1 Pollnow, NE NW SW 4-3s-29w. IPP 79 BOPD, Lansing-Kansas City 3,734-41 ft. TD 4,406 ft. (Opens Pollnow pool.)

Ellis County: Jones, Shelburne & Farmer 1 Schmidt, SE SE NE 23-12s-17w. Dry. TD 3,740 ft.

*Harper County: The Texas Co. 1 Springer, NE NE SE 23-31s-6w. IP 3,800 M.c.f. gas daily, Simpson 4,648-56 ft. TD 4,818 ft. (Opens Runnymede pool.)

Marion County: H. J. Uhl et al 1 Black, NW SW NE 1-22s-3e. Dry. TD 2,465 ft.

*Morton County: Cities Service Oil Co. 1 Humble, CSE NW 4-33s-43w. IP 26,900 M.c.f. of gas daily, Hugoton pay. TD 3,320 ft.

Rice County: M&L 1 Caldwell, NW NW NE 29-20s-9w. Dry. TD 3,380 ft.

Russell County: Borrell & Miller 1 Heine, CSL SE SE 32-12s-11w. Dry. TD 3,540 ft.

Sedgwick County: Cities Service Oil Co. 1 Moyniham, SE SE NW 23-28s-2e. Dry. TD 3,361 ft.

Stafford County: Westgate-Greenland 1 Garner, SE SE SE 8-24s-13w. Dry. TD 4,153 ft.

*Trego County: Imperial 1 Walker, SW NE SW 4-11s-23w. IP 2,192 BOPD, Lansing-Kansas City 3,561-68 ft. TD 4,059 ft. (New pool.)

Republic Natural Gas Co. 1 Reidel, SE SW SE 20-14s-23w. Dry. TD 4,598 ft.

CALIFORNIA

Colusa County: Union Oil Co. 1 Union-Brazos-Doherty, 5-16n-2w. Dry. TD 4,325 ft.

Fresno County: Humble Oil & Refining Co. 1 E. B. Stone, 13-13s-11e. Dry. TD 4,480 ft.

Kern County: A. M. Dunn 1 D.L.K., 4-27s-27e. Dry. Vedder 3,510 ft. basement 5,082 ft. TD 5,084 ft.

* Los Angeles County: Standard Oil Co. 6-1 Mission, 2-2n-16w. IP 229 BOPD, 24/64-in., 24.6°, perforations 7,175-7,338 ft. TD 7,338 ft. (New field discovery near Mission field.)

G. E. Miller, Opr. 1 Garvey Hills South-unit, 26-1s-12w. Dry. TD 3,879 ft.

Atlas Oil Co. 1 Acosta, 24-5n-16w. Dry. TD 3,939 ft.

San Luis Obispo County: The Texas Co. 1 Wreden, 1-29s-16e. Dry. TD 4,577 ft.

Santa Barbara County: Smith Ranch Oil Co. 1 Smith Ranch, 17-10n-27w. Dry. TD 3,995 ft.

Blackwood & Nichols Co. 1 Hollister, 31-5n-32w. Dry. TD 5,329 ft.

Union Oil Co. 1 Martin, 18-7n-33w. Dry. TD 5,292 ft.

MONTANA

* McCone County: Regent Drilling Co. 1 Shock, SW NE SW 22-23n-49e. IPP 132 BOPD, Mission Canyon 7,056-88 ft., TD 7,506 ft. Mission Canyon 7,049 ft. (New field.)

NEVADA

Elko County: Gulf Oil Corp. 1 Unit, C NE SE 36-30n-64e. Dry. TD 3,158 ft. Oquirrh 675 ft.

WYOMING

Johnson County: Chicago Corp. and Republic Natural Gas Co. 1 Government, NW NE SE 34-43n-78w. Dry. TD 14,155 ft., Sundance 13,825 ft.

Niobrara County: Crusader Corp. and Lion Oil Co. 1 Government, NE SW 23-36n-6w. Dry. TD 2,955 ft.

* Weston County: Voss Oil Co. 1 Scott, SW NW NE 23-42n-66w. IPP 250 BOPD, Newcastle 6,850 ft. TD 6,908 ft. Discovery.

UTAH

Emery County: El Paso Natural Gas Co. 1 Pack Saddle, N½ SE NE 12-18s-12e. Dry. TD 6,801 ft. Quartzite 6,058 ft.

COLORADO

* Logan County: Roden, Darden & McRae & Balderson 1 Monroe, NE NE NE 11-10n-54w. IP 5,000 M.f.g., "J" sand 5,072 ft. TD 5,149 ft.

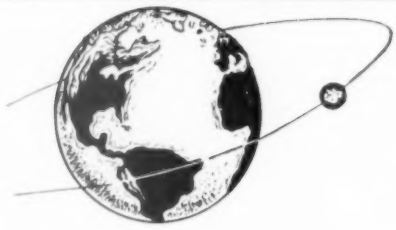
* Roden, Darden & McRae & Balderson 1 Haywood, SW SE SE 6-11n-54w. IP 4,000 M.f.g., "D" sand, 5,344 ft. TD 5,558 ft.

Herndon Drilling Co. 1 Grauberger, NW SW SE 13-6n-50w. Dry. TD 4,437 ft. "J" sand 4,338 ft.

J. L. Taylor 1 Rallens, SE SE NW 33-9n-53w. Dry. TD 5,012 ft. Skull Creek 5,003 ft.

Washington County: W. R. Whittaker Co. Ltd. 1 Phillip Foy, NE NE SE 32-2n-51w. Dry. TD 4,558 ft. Skull Creek 4,553 ft.

(Continued on page 168)



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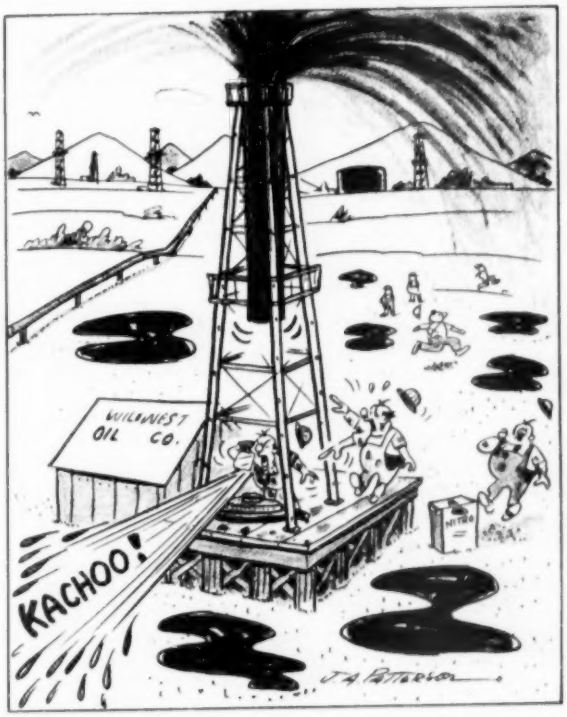
records indicate D & S equipment

is giving the best performance

at less cost per foot!

DRILLING & SERVICE
3031 Elm Street
Dallas 1, Texas

Core barrels, Truco diamond coring and drilling bits, straight hole drilling, washover shoes, whipstock, window cutting.



THE OIL AND GAS JOURNAL

"Gesundheidt! And hand me a cap—he stopped her!"

EQUIPMENT MEN

Sanders Is Named By Drilling Specialties Co.

B. J. Sanders has recently established residence at 35 North Dos Caminos, Ventura, Calif., and will represent Drilling Specialties Co., of Bartlesville, Okla., distributors of Driscose, a drilling-mud additive, in California fields.

Schaller Is Made Western Division Sales Manager

H. E. SCHALLER

Herman E. Schaller, sales engineer of McCullough Tool Co., has been appointed Western division sales manager, radiation-logging department, according to I. J. McCullough, president.

Schaller graduated from University of Southern California in 1940, and in 1947 he received his master's degree in petroleum engineering. His oil-field-engineering experience includes 3 years with the conservation committee of California Oil Producers as a field engineer, 1 year with Texas Co. as development engineer, 2 years with Eastman Oil Well Survey Co. as sales representative and division sales manager, and 4 years with McCullough Tool.

Rockwell To Open New Plant In Sulphur Springs, Tex.

Rockwell Manufacturing Co. will open a new valve and meter plant in Sulphur Springs, Tex., during the latter part of the year, according to Lloyd A. Dixon, Jr., vice president of the firm's meter and valve division.

The plant, now under construction, will be devoted largely to production of Nordstrom valves — particularly 4-in. and smaller steel Hypreseal valves in every pressure range. The new factory is being established to serve the entire South and Southwest and a large part of its output will go to oil fields in Texas, Oklahoma, Louisiana, and Mississippi.

The one-story brick-and-tile 125,000-sq. ft. plant is completely air conditioned. Except for the office space, it is windowless, a design feature incorporated to provide controlled conditions in which to perform close-tolerance manufacturing operations. Castings will be shipped to the plant from outside sources of supply, and all machining and assembling will be performed at the plant.

Miller Printing Machinery Buys Kerotest Facilities

Miller Printing Machinery Co., of Pittsburgh, recently announced the purchase of Kerotest Manufacturing Co. of the same city. All Kerotest preferred and common stock has been acquired by the Miller company.

Miller has been in the graphic-arts field since 1903. It has manufactured automatic cylinder letter presses since 1926 and has gained a predominant position in that field.

R. B. Tullis, president of Miller, stated that Kerotest will be operated as a separate company with a few executives of the Miller company acting in an advisory capacity.

Kerotest was incorporated in 1909 as Pittsburgh Reinforced Brazing & Machine Co., and in 1914 began the manufacture of high-pressure valves. In 1927 the corporate title was changed to Kerotest Manufacturing Co. Kerotest valves are well known as a standard for oil-field valves, and over the past 25 years they have been continuous suppliers to the world's outstanding oil producers.

Cherokee Laboratories Opens Area Office at Midland, Tex.

Opening of an office in Midland, Tex., to serve West Texas and New Mexico, has been announced by Cherokee Laboratories, Inc., of Tulsa, which firm specializes in drilling-mud lost-circulation problems, and offers 24-hour service to the oil industry.

C. A. (Chuck) Einarsen, who was formerly district mud engineer in Midland for Stanolind Oil & Gas Co., has been named area manager in Midland.

Einarsen is a graduate in petroleum engineering from Colorado School of Mines. After joining Stanolind, he served as division mud engineer in Fort Worth and worked for 6 months in the company's research laboratory in Tulsa.

Stevenson Is Chief Engineer For United Machine Co.

J. M. STEVENSON

John M. Stevenson has assumed the duties of chief engineer of the oil-field-equipment division of United Machine Co., Fort Worth, as announced by Paul I. Stevens, president.

Stevenson has a wide experience in design and application of oil-field equipment. He served 2 years in the heavy-machinery division of Allis-Chalmers Manufacturing Co., and 2 years as industrial engineer with a public-utility company. His former activities also included 4 years as mechanical engineer in the materials-testing division of the engineering department of Phillips Petroleum Co., and 3 years as development engineer for Youngstown Sheet & Tube Co.

In his present capacity, Stevenson will be responsible for the design, development, and engineering of specialized equipment for the oil industry.

Executive Promotions Made By National Aluminate Corp.

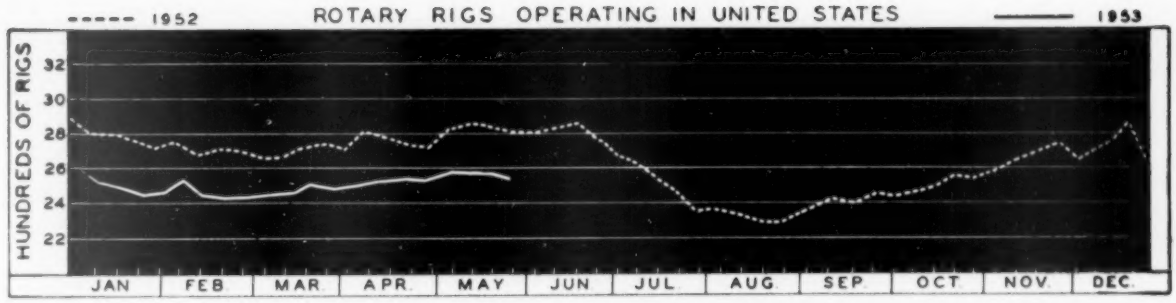
National Aluminate Corp., of Chicago, recently announced the promotion of Dr. David G. Braithwaite, Gage Averill, and Heman R. Powers to assistant vice presidents. National Aluminate is manufacturer of Nalco water treatment chemicals, Nalcat petroleum catalysts, paper process chemicals, and fuel-oil treatments.

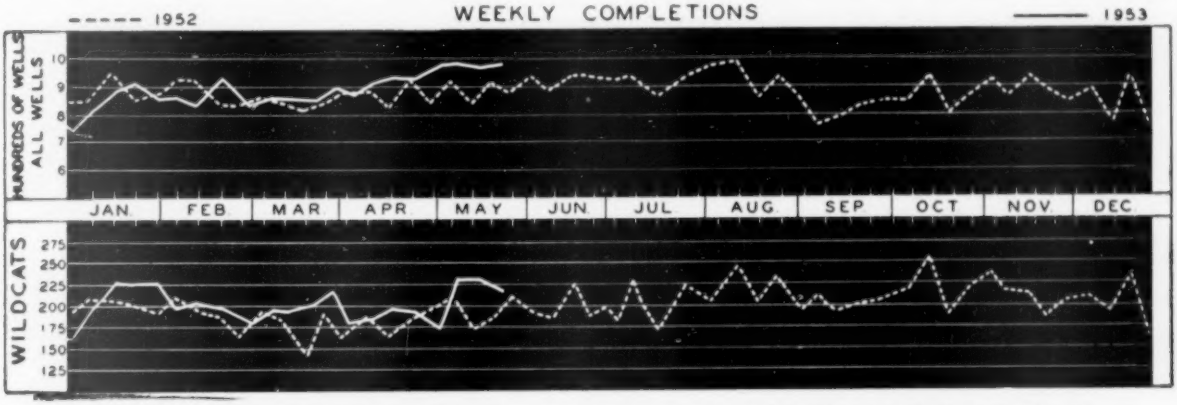
Braithwaite has been in the Nalco organization approximately 11 years. Prior to taking over as catalyst production manager, he was associated with Nalco's zeolite department.

Averill joined catalyst division as sales manager in November 1949. Previous to that time he managed catalyst sales for American Cyanamid.

Powers has been Nalco field manager of industrial sales and service since June 1951. He was advanced to this position from district manager in the Pittsburgh area, where he accumulated a broad background on water treatment in the industrial power field.

(Continued on page 169)





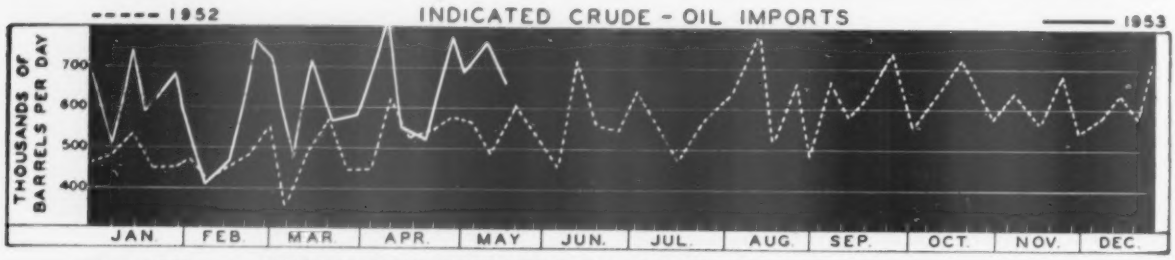
CURRENT STATISTICS

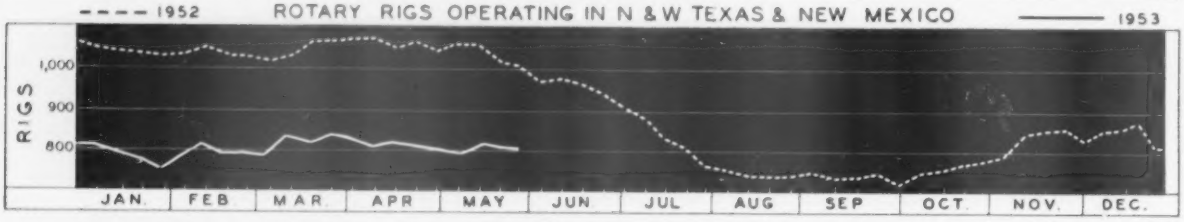
EXPLORATION

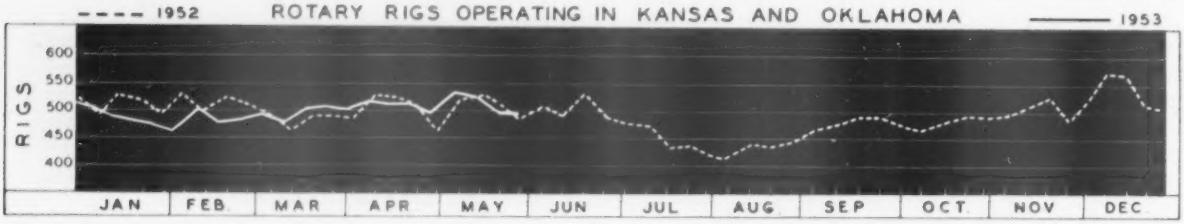
WEEKLY WELL COMPLETIONS . . . WEEK ENDED MAY 23, 1953

	Total of all wells					May 23		Wildcat completions and discoveries					Cumulative total, 1953				
	Comp.	Oil	Gas	Dry	Footage	1953	1952	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	14	7	0	*7	20,100	267	299	0	0	0	0	0	0	0	0	0	0
Pennsylvania	34	17	4	†13	63,600	659	669	0	0	0	1	1	0	0	3	8	11
West Virginia	14	2	11	1	40,733	233	244	0	0	0	0	0	0	0	4	2	6
Ohio	21	6	3	‡12	42,928	383	374	0	0	0	1	1	1	0	1	10	12
Indiana	28	17	1	10	44,051	466	430	1	0	0	5	6	8	0	1	104	113
Kentucky	21	3	8	10	58,583	413	510	0	0	0	3	3	5	0	0	74	79
Illinois	26	13	0	13	65,595	650	611	1	0	0	3	4	3	0	0	127	130
Michigan	11	1	0	10	28,710	210	266	0	0	0	5	5	7	0	3	81	91
Kansas	95	46	12	‡37	322,934	1,914	1,853	3	0	3	8	14	40	0	19	300	359
Nebraska	10	5	0	5	54,170	116	94	1	0	0	5	6	8	0	0	51	59
Oklahoma	149	79	6	§64	493,169	2,728	2,316	4	0	2	11	17	49	4	12	245	310
Texas	372	222	19	131	1,755,676	6,712	7,240	25	0	2	89	116	341	24	81	1,630	2,076
North Central (Dist. 7-B & 9)	128	71	0	57	439,368	2,442	2,270	11	0	0	36	47	174	0	8	677	859
West (Dist. 7-C & 8)	114	90	0	24	603,771	1,470	2,248	10	0	0	18	28	67	2	5	249	323
Panhandle (Dist. 10)	16	6	9	1	47,032	336	276	0	0	0	0	0	0	2	0	10	12
Eastern (Dist. 5 & 6)	13	7	1	5	67,054	319	366	1	0	0	4	5	9	2	3	103	117
Gulf Coast (Dist. 2 & 3)	45	21	5	19	309,030	1,011	1,080	3	0	1	14	18	50	5	35	261	351
Southwest (Dist. 1 & 4)	56	27	4	25	289,421	1,134	1,000	0	0	1	17	18	41	13	30	330	414
Louisiana	44	26	3	15	324,897	983	883	3	0	0	6	9	23	6	9	130	168
Northern	18	9	2	7	65,494	385	463	0	0	0	3	3	1	0	2	45	48
Southern	26	17	1	8	259,403	598	420	3	0	0	3	6	22	6	7	85	120
Arkansas	10	6	0	4	31,900	177	151	0	0	0	1	1	5	0	0	34	39
Mississippi	8	2	1	5	49,685	135	149	0	0	0	3	3	6	0	3	68	77
Southeastern States	2	0	0	2	12,582	53	23	0	0	0	2	2	1	0	0	38	39
Montana	10	9	0	1	38,701	142	81	1	0	0	0	1	2	0	0	36	38
Wyoming	13	6	3	4	71,417	228	239	1	0	0	2	3	6	0	0	36	42
Colorado	14	7	3	4	69,334	193	157	1	2	0	3	6	7	2	5	94	108
Utah	1	0	0	1	6,801	29	27	0	0	0	1	1	1	0	0	19	20
New Mexico	29	15	7	7	147,340	505	379	0	0	1	5	6	8	0	6	52	66
California	49	39	0	10	236,303	993	1,005	1	0	0	9	10	24	0	3	226	253
North Dakota	6	6	0	0	51,482	98	16	0	0	0	0	0	2	0	0	18	20
Miscellaneous	2	0	0	2	8,300	20	29	0	0	0	2	2	1	0	0	16	17
Total United States	983	534	81	368	4,038,991	18,307	18,045	42	2	8	165	217	548	36	150	3,399	4,133
Total previous week	969	482	97	390	3,948,913			27	0	9	196	232	506	34	142	3,234	3,916
Total May 24, 1952	896	492	51	353	3,620,267			35	1	4	170	210	579	40	102	3,143	3,864

Service wells included: *7, †13, ‡2, §3.



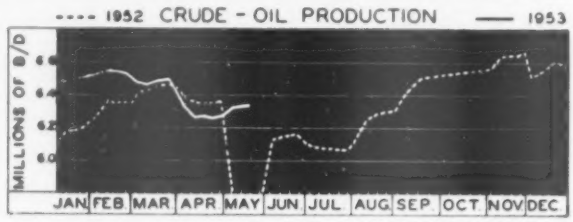


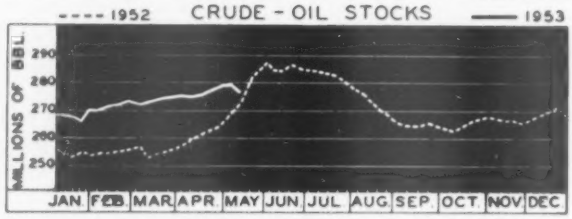


DAILY AVERAGE PRODUCTION FOR WEEK

	May 23 Crude oil	May 23 Lease condensate	May 23 Total	May 16 total
Alabama	4,800		4,800	4,800
Arkansas	77,250	650	77,900	77,100
California	1,000,200		1,000,200	999,500
Colorado	98,500		98,500	92,600
Eastern	58,000		58,000	57,900
Florida	1,500		1,500	1,500
Illinois	162,200		162,200	158,800
Indiana	35,200		35,200	35,500
Kansas	330,900		330,900	329,300
Kentucky	29,600		29,600	29,900
Louisiana	661,075	41,100	702,175	701,925
North	110,750	2,600	113,350	113,100
South	550,325	38,500	588,825	588,825
Michigan	33,700		33,700	34,100
Mississippi	94,950	4,150	99,100	98,350
Montana	30,500		30,500	30,000
Nebraska	13,600		13,600	13,600
New Mexico	189,225	700	189,925	190,025
Oklahoma	534,300		534,300	532,600
Texas	2,671,575	45,475	2,717,050	2,717,050
Dist. 1	35,075	350	35,425	35,425
Dist. 2	146,500	6,325	152,825	152,825
Dist. 3	438,625	23,000	461,625	461,625
Dist. 4	248,725	5,200	253,925	253,925
Dist. 5	46,700	400	47,100	47,100
Dist. 6	119,950	5,700	125,650	125,650
East Texas field	247,000		247,000	247,000
Dist. 7-B	108,000	75	108,075	108,075
Dist. 7-C	151,800	3,500	155,300	155,300
Dist. 8	888,250	200	888,450	888,450
Dist. 9	168,250	700	168,950	168,950
Dist. 10	72,700	25	72,725	72,725
Utah	5,700		5,100	5,000
Wyoming	208,500		208,500	207,200
North Dakota	14,200		14,200	14,000
Total U. S.	6,254,875	92,075	6,346,950	6,330,750
Change from previous week, up			16,200	
Canada				208,908
Total U. S. production January 1-May 23			919,086,075 bbl.	
Same period last year (crude plus cond.)			*885,732,400 bbl.	

*Includes 13,008,835 bbl. condensate.



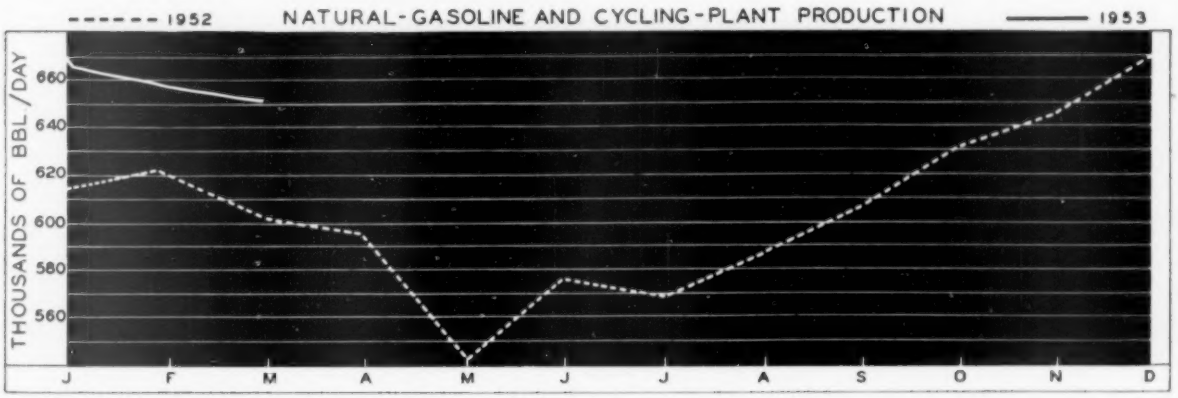


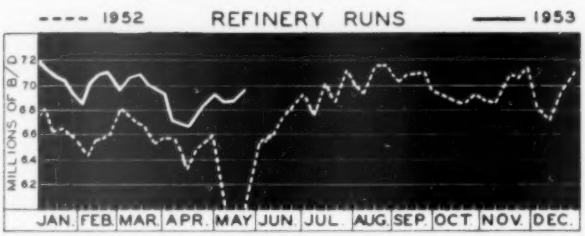
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

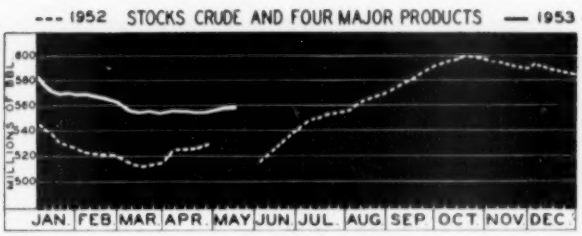
(Thousands of barrels)

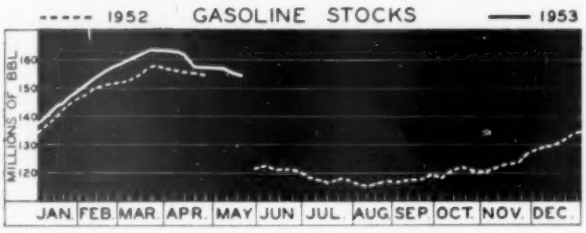
	May 16, '53	May 9, '53	May 17, '52
Pennsylvania Grade	2,519	2,550	2,485
Other Appalachian	1,912	2,206	2,057
Illinois, Indiana, Michigan	11,890	11,891	12,049
Arkansas	2,917	2,914	3,136
Louisiana	16,173	16,037	15,108
North	2,899	2,958	2,716
Gulf	13,274	13,079	12,392
Mississippi	4,144	4,192	3,336
New Mexico	7,234	7,385	7,480
Oklahoma and Kansas	38,389	38,437	44,022
Texas	133,787	134,562	138,640
East Texas proper	10,915	11,185	13,353
West Texas	64,471	63,467	61,644
Texas Gulf	25,523	25,870	30,781
Other Texas	32,878	34,040	32,862
Rocky Mountain	16,015	16,317	15,965
California	32,193	32,349	30,094
Foreign	9,675	9,345	7,409
Total	276,848	278,185	281,781

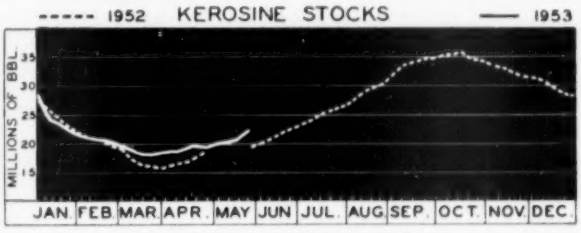
*Bureau of Mines.

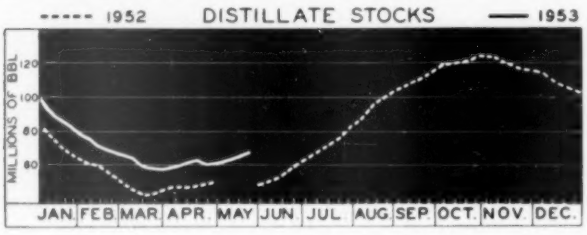


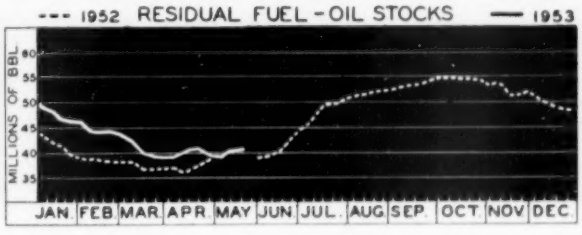










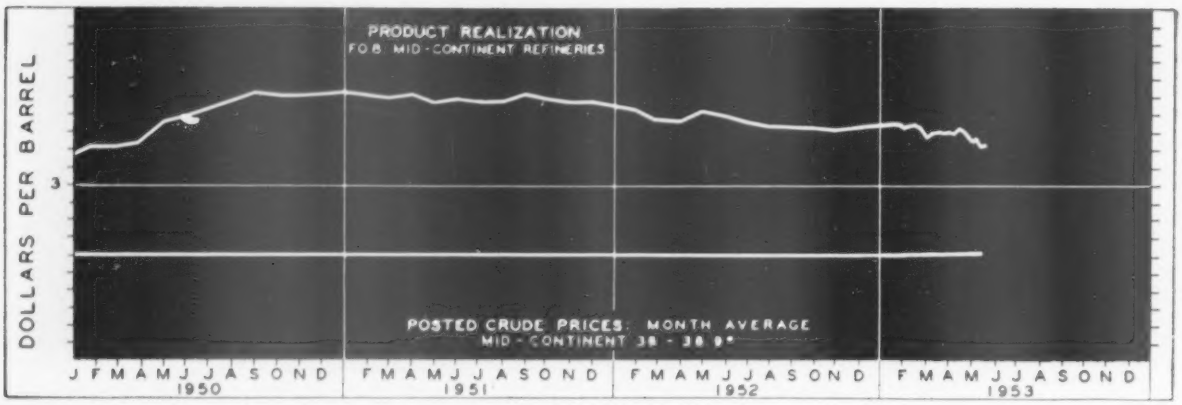


A.P.I. REFINERY REPORT, MAY 23

(Thousands of barrels)

District—	Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.	Stocks‡—Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, May 1952—Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.
East Coast	1,052	429.0	33.7	238.0	220.7	34,892	9,890	21,642	10,627	1,005	411.0	43.0	219.7	203.7
Appalachian:														
District 1	106	45.0	6.3	13.7	16.1	3,755	458	843	314	102	43.9	3.3	16.3	13.3
District 2	97	47.9	3.6	11.1	15.9	1,685	264	395	111	43	22.9	2.0	7.3	8.6
Ind., Ill., Ky.	1,261	646.1	78.4	215.4	154.9	31,984	3,887	9,640	3,206	741	378.1	37.3	127.4	105.0
Okla., Kans., Mo.	572	327.7	13.3	143.2	53.4	16,955	1,321	7,293	1,215	373	205.9	9.5	82.7	37.7
Inland Texas	260	163.7	11.6	45.1	32.7	6,497	416	1,308	1,038	269	187.8	12.4	41.6	42.2
Texas Gulf Coast	1,655	764.3	113.8	379.2	231.0	20,506	3,237	9,231	6,158	629	270.1	55.0	184.7	77.3
La. Gulf Coast	568	272.4	46.0	149.4	56.0	7,198	2,003	4,334	1,145	507	236.8	51.6	110.9	59.1
N. La. and Ark.	88	31.6	9.0	18.7	8.7	3,395	340	1,129	174	66	22.7	3.6	14.9	7.7
Rocky Mountain:														
New Mexico	20	13.0		2.9	3.9	156		34	29	17	10.1	.5	3.1	4.3
Other Rocky Mtn.	238	121.7	7.4	49.7	45.4	6,784	339	1,681	905	189	79.9	4.0	41.1	36.0
California	1,066	443.7	4.9	139.3	368.2	20,116	385	9,522	15,707	964	426.0	6.3	132.0	383.7
May 23, 1953	6,983	3,306.1	328.0	1,405.7	1,206.9	153,923	22,540	67,052	40,629	4,905	2,295.2	228.5	981.7	978.6
May 16, 1953	6,884	3,280.0	373.6	1,320.6	1,238.0	155,415	21,360	64,941	40,258					
May 24, 1952						(Data incomplete for 1952 strike period)								

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.0°
J F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952
F M A M J J A S O N D
1953

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.22 for week ended May 16, $3.20 for previous week, and $3.41 for May 1952. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of May 27, 1953. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	10¼-10½	12-12.75	10½-11
Premium gasoline	11⅜-11½	13.125-14	11¾-12
42-44 w.w. kerosine	8⅜-8¾	10.15-10.65	9
No. 2 straw fuel oil	7⅜-7¾	9.15-9.65	8
No. 6 residual	$0.90-1.00	$2.10-2.25	$1.60-1.70

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5½	5	5¼
Grade 18-55	6.60	6.10	6.35

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	12-13
750 vis., No. 3-4 neutral	15-16
2,000 No. 5-6 neutral	17-18

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	20.5-22
200 vis., No. 3 neutral, 0-10 pp.	12-13

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	26.5
180 vis., 10 p.t. neutral	28.5

WAX

Mid-Continent

132-134 A.M.P.	6.0

REPORTED increases in sales of gasoline by primary suppliers indicate that marketers are expecting record sales for June, the opening month of the summer driving season.

Some strengthening of the gasoline market on the Gulf Coast is shown by slightly higher prices being paid for aviation gasoline and the boost of 0.25 cent a gallon for regular gasoline by at least one refiner. This firming has not become general enough to change the low of the market but each piece of evidence is being checked by marketers on the East Coast.

In the Mid-Continent, the market is highlighted by the disappearance of distress gasoline at pipe-line terminals. Near the end of the first quarter, gasoline at pipe-line terminals was freely available at the low plus pipe-line transportation, and in a few cases it could be bought at 0.125 cent under the low. Current reports indicate that gasoline at the low plus transportation is very scarce at pipe-line terminals. Slightly better prices are also reported for barge terminals.

Movement of heavy fuel has been above normal in the Mid-Continent as well as on the East Coast. However, there is evidence that East Coast residual is losing some of the price strength despite the fact that material at the prevailing price of $1.60 on the Gulf Coast is scarce.

Part of the shift in the New York Harbor area may be due to further softening of the spot tanker market. A dirty tanker was reported taken at the Maritime Commission base less 40 per cent for a Caribbean-North of Hatteras cargo. This compares with rates of about USMC less 30 per cent early in May. The latest rate represents about 26.3 cents a barrel compared with 30.7 cents a few weeks ago and $1.30 in the 1951-52 winter.

If the Gulf Coast residual price does not move up, spot quotations on the East Coast may drop 5 or 10 cents a barrel.

CRUDE PRICES GRAVITY SCHEDULE

	Signal Hill, Calif‡	Okla. homa, Kansas	Gulf Coast Tex.*	West Tex.†
14-14.9	$1.87	....	....	....
15-15.9	1.93	....	....	....
16-16.9	1.99	....	....	....
17-17.9	2.05	....	....	....
18-18.9	2.11	....	....	....
19-19.9	2.18	....	....	....
20-20.9	2.24	$2.25	....	$2.12
21-21.9	2.30	2.27	....	2.14
22-22.9	2.37	2.29	....	2.16
23-23.9	2.45	2.31	....	2.18
24-24.9	2.53	2.33	$2.56	2.20
25-25.9	2.61	2.35	2.58	2.22
26-26.9	2.69	2.37	2.60	2.24
27-27.9	2.76	2.39	2.62	2.26
28-28.9	2.83	2.41	2.64	2.28
29-29.9	2.91	2.43	2.66	2.30
30-30.9	2.97	2.45	2.68	2.32
31-31.9	3.04	2.47	2.70	2.34
32-32.9	3.12	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico.

Last general price change represented a 50-cent increase, effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Louisiana:	
Beauregard Parish	$2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.83
Van	2.48
Pennsylvania Grade:	
Bradford	4.40
Southwest Pennsylvania	3.97
West Virginia	3.91
Illinois Basin	2.77

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EQUIPMENT FOR SALE

FOR SALE: #3 National Cable Tool Drilling Machine, complete with tools (including new 1" drilling line, new 8" bits). Complete strings of casing needed to drill from surface (15½, 12½, 10, 8"). Will sell machine & tools or drilling lines or individual strings of casing or complete outfit. Contact O. S. Anderson, Box A, Oilton, Oklahoma.

DIESEL Generating Unit. 746 Hrs. operating time—37½ KVA, 3 Phase, 60 Cy. 220/40 V. 1800 RPM, Century Gener. connected to 72 HP Model 6DTG317 B/M #D3076 Buda Diesel. Price $3,000. Red Head Oil Co., Brilliant, Ohio.

FOR SALE

SUPERIOR HEAVY DUTY DIESEL

510 hp. at 360 r.p.m.—5 cylinder—14½x18 type ZDSB — non-reversing — vertical—4 cycle—cold starting—mechanical injection. Engine is totally enclosed. Complete with a 48" 7 groove V-belt sheave and new spare parts. For heavy duty pumping, dredge service, power generation, textile and saw mills, mining, etc. EXCELLENT CONDITION, IMMEDIATE DELIVERY.

G. M. 3-71 DIESEL GEN. SET

30 kw. 2 cylinder 4½x5 diesel—radiator cooled—electric starting. Delco 3/60/440 generator — with switchgear. Skid mounted. Portable.

30 KW SHEPPARD DIESEL SETS

30 kw. Sheppard—115 volts DC—radiator cooled. Built 1950. Excellent condition. Self-mounted radiator and fuel tank. 16 units available.

100 KW G. M. 3-268A A.C. DIESEL GENERATOR SETS

440 volts—3 phase—60 cycle. 20 kw. D.C. generator on same shaft—5 kw. exciter—120 volts D.C.—electric starting.

LORIMER SLOW SPEED 100 KW A.C. DIESEL GENERATOR SET

Slow speed heavy duty unit. 150 hp.—5 cyl.—4 cycle—720 r.p.m.—electric starting—Ross heat exchanger—engine operating panel. Allis-Chalmers generator—100 kw.—440/3/60—80% PF—cubicle deadfront switchgear. Can quote with radiator if desired.

300 KW G. M. D.C. DIESEL SET

ENGINE: G.M. 8-268A—6½x7—1200 r.p.m.—air starting. GENERATOR: 300 kw. G.E.—120/240 volts D.C.—3 wire—totally enclosed—Marine type BB—with switchgear.

ELECTRIC WINCHES

Single drum—50 hp. 230 volt D.C. motors—built-in controls.

STEAM TURBO-GENERATOR SETS

300 kw—120/240 volts D.C.—1200 r.p.m.—1250 amps.—turbine W.P., 225 lbs. to 440 lbs.

MARINE SURFACE CONDENSERS

1050 sq. ft.—3000 sq. ft.

THE BOSTON METALS CO.
314 E. BALTIMORE ST.
BALTIMORE 2, MARYLAND
CALVERT 7-5050

EQUIPMENT FOR SALE

N-4 BREWSTER rotary drilling rig, 12" Gardner-Denver pump w/ NKU Waukesha engine, Lee C. Moore mast, 51½' Substructure, 5800' of 3½" Ext. upset int. flush drill pipe. All purchased new. Has been in use 12 mos. A-1 condition. Write Box 4657, Oklahoma City, or Pho. ME 4-1413.

FOR SALE: Model R.L. 3-Drum Cardwell Spudder, Trailer Mounted, complete with all tailing-in tools. 7000 feet almost new 9/16-inch and ¾-inch lines. Will sell with or without tools. For full description and inventory, write Box G-406, The Oil and Gas Journal, Tulsa, Oklahoma.

USED ROTARY, cable tools, and production equipment. E. A. Kelly, 3131 S.E. 29th Street, P. O. Box 861, Oklahoma City. Phone Jackson 56407.

DRILLING EQUIPMENT FOR SALE

Power pumps, drilling engines, rotary tables, pipe, tubing and tanks. Hoffman Pipe & Supply, Box 1368, Longview, Texas.

For Sale
CASING AND TUBING

IN STOCK AT HOUSTON, AVAILABLE FOR PROMPT SHIPMENT, 5½" OD & 7" OD prime, seamless casing, short and long T&C, J-55. Write or call for attractive prices

Baron Tube Company
722 Oliver St. N.W. Atlanta, Ga.

EQUIPMENT FOR SALE

FOR SALE: 1 Wilson Atlas Draw Works, Serial #6245. 2 G.A.K. Waukesha engines, completely overhauled with all new parts. A-1 condition. Makin Drilling Company, Box No. 1628, Phone 3-3141, Hobbs, New Mexico.

TWO — 60W — BREWSTER — 6000'— Well-Servicing Units, Complete, W/Rod & Tubing Tools. 8 x 7 Double Pole Mast, Truck Mounted, Ready to Work. Also, Allis-Chalmers, Muskogee, Wilson & Cardwell Skid Units. General Tool & Supply Co. P.O. Box 4387. Oklahoma City, Okla.

FOR SALE

4500' 4" standard, 2500' 4½" standard, 9200' 6" standard, in single and double random lengths, plain end, all straight, clean, shows no pitting, located Rawlins, Wyoming.

10,000' 4¾" O.D. used seamless steel tubing, ⅜" wall, approx. 28' lengths, plain end, located near Chicago.

We carry large quantities of used seamless steel boiler tubing from 1⅞" O.D. to 5½" O.D. suitable for high pressure oil, gas and water lines, all straightened, cleaned inside and out, shows practically no pitting, all tested for 1000# hydrostatic pressure at our plant before shipment.

Also large quantities of new and guaranteed used steel pipe and tubing up to 36" in diameter in lightweight, standard and extra strong.

All for immediate shipment. Please phone or wire collect.

A. GREENSPON PIPE CO., INC.
50 South Bemiston Avenue
St. Louis 5, Missouri
Phone: PArkview 6885

ALL API GRADES
CASING TUBING LINEPIPE

Directly from DALMINE (Italy) Mill
API Monogrammed Quick Deliveries Competitive Prices*

A Continuous Source of Supply Now Serving
Numerous U. S. Major Oil Companies
Proven Record of Reliability
Direct Shipments to All Principal Ports

Send Your Inquiries to

TRANSCONTINENTAL STEEL INC.
271 CHURCH STREET NEW YORK 13, NEW YORK

*Prices will be found even more attractive for material used in operations outside U.S.A. because of elimination of U.S. duty and ocean freight differentials.

EQUIPMENT FOR SALE

FOR SALE: 80,000′ 4½ O.D. S.S. line, 60,000′ 3½ O.D. line, 60,000′ 6⅝ S.S. line. Lundquist Pipe & Supply Co., Phone 5-8850, Tulsa, P.O. Box 1215.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

EVERYTHING in new and used equipment for well drilling. Fishing tools rented. Save money, get quotations from Pressey & Son, Pueblo, Colorado.

2—Model 07 Murray and Tregurtha Harbormaster Outboard Propulsion Units with twin 6-71 GM Diesel Engines. Each unit rated 330 horsepower. Ideal power units for barge used in connection with off shore drilling. Sohio Petroleum Company, 407 N. 8th St., St. Louis, Missouri.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units, Westinghouse 20-25-50 KW Generating Units

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

FOR SALE
DIESELS AND PUMPS

Two new 1947 unused 475 BHP 5 cylinder Baldwin Model VG Diesel Engines, each connected to Worthington Horizontal Triplex Double Acting Pump, both units with Falk Couplings and other accessories. Location Ohio, immediate delivery. Direct inquiries to

THE BUCKEYE PIPE LINE CO.
Joseph Steele, Purchasing Agent
Room 2200, 30 Broad St.
New York 4, N. Y.

FOR SALE

New and Used material—Immediate delivery from stock, Angles, Channels, I and WF Beams, especially for construction needs.

H BEAMS **PILE SECTIONS**

Phone or Wire your steel requirements.

We are also interested in purchasing your surplus material. We assure you our prices will be the best obtainable.

CARSAND STEEL CORP.
14-23 34th Avenue
Astoria, New York
Astoria 8-4484 8-8023

EQUIPMENT FOR SALE

TWO light shot hole drills. Hydraulic rigs mounted on used Ford trucks. Just came out of the field. Price $3500.000 each, with used water truck included. Located at 3820 N. W. 39th Street in Oklahoma City. Phone Windsor 2-4226. Young Exploration Company.

FOR SALE or rent 3½" OD Internal Flush, External Upset, Modified drill pipe. Chapman Pipe & Supply ME-81567, Box 4232, Okla. City, Okla.

LEATHER DIAPHRAGMS for sale. 150 No. 2 Toby, 250 No. 3 Toby, 100 No. 1 Iron Clad. Price one-half of list. Geo. R. Milner, Okmulgee, Oklahoma.

FOR SALE: LOCKHEED PV-1 unconverted Airplane. Cruise 260 to 270 mph., range 1500 miles, 600 total hours since new. Will stand rigid inspection. Bomb Bay tanks and dual control kit furnished with this offer. Low dollar offer $46,500. For executive Aircraft, Lockheed, Douglas, and Beechcraft, write or wire Sasco, P. O. Box 2672, Telephone 4-4549, Tulsa, Oklahoma.

5,000 NEW 2⅜" O.D. standard merchant couplings galvanized, and black. Special price $10.00 per hundred; will sell any part. Also 8,000 8⅝" O.D. line pipe 8-V thread couplings priced $1.50 each, also 2500 10¾" O.D. off of 40½ lb. line pipe as well as 3500 12¾" O.D. 8-V thread. A. A. Gilbert Pipe & Supply Co., Shreveport, La.

FOR SALE: 24-L Bucyrus, 1½ ton GMC truck, 1 ton GMC pick up, small and large tools. Inventory on request. W. E. Dunigan, % Dunigan Tool & Supply Co., Odessa, Texas.

FOR SALE: Worthington Gas-Diesel Engine. CG-6, 360 hp., 400 r.p.m., #G-752. (a) Manzel forced feed lubricator. (b) American Bosch magneto. (c) Woodward governor. (d) All controls, all spare parts unused. Actual running hours, 5,000 hrs. Excellent condition, reasonable. Wabash Power Equipment Co., c/o A-P Development Corp., Mr. Paul Zimmerman, 1st Nat'l Bank Bldg., Lubbock, Texas.

FOR SALE

Complete National 100 Rig including 3 PTD-6 Superior Diesel Engines with dual fuel equipment, 136′ Lee C. Moore Mast with 8′ substructure, 2 C-350 Ideal Power Pumps, Ideal Type 548 TC Traveling Block, Type R3 Swivel, and Type MS-20½ Rotary Table. Excellent condition, priced reasonable, located in Montana. Complete inventory upon request

Box G-341

The Oil and Gas Journal,
Tulsa, Oklahoma

EQUIPMENT FOR SALE

FOR SALE: In Oklahoma and Kansas approximately 9 miles 2", 11 miles 3", 10 miles 4", 10 miles 6", and 6 miles of 7", lapweld used plain end, plain end beveled, and T&C used line pipe. Complete list furnished upon request. Cities Service Oil, Patridge, Bartlesville, Oklahoma.

10—10,000 Gal. RR Tank Car Tanks with heating coils. $685 each. In Florida. Lestan Corp., Rosemont, Pa.

USED 4½" and 3½" Sonoscoped Drill Pipe, Casing, Tubing, Rotary and Cable Tool Rigs and production equipment. Giffin & Thompson Supply, Hoisington, Kansas. Tel. 477.

OIL COMPANY for sale; income approx. $20,000.00 per mo. Also Denver-Julesburg basin drilling deals. Box 115 or Phone 345, Brush, Colorado.

FOR SALE: 8" C. P. Drill Collars. W. E. Dunigan, % Dunigan Tool & Supply Co., Odessa, Texas.

FOR SALE: National 50 drilling rig, complete less drill pipe, 127 ft. Lee C. Moore jack knife derrick, 8 foot substructure, three NKU Waukeshas, C250 mud pump, 16 6" drill collars, B. J. Hook, National swivel and traveling blocks, Bethlehem rotary table. Inventory on request. W. E. Dunigan, % Dunigan Tool & Supply Co., Odessa, Texas.

EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

NOTICE: We buy. We sell equipment everywhere. If you want to sell or buy, contact Pressey & Son, Pueblo, Colorado.

WANTED—Bolted type steel tanks, new, and if used must be A.P.I. late type having a capacity of 500 bbl. and larger. Also high pressure welded steel tanks 10,000 gal. and larger for propane.

A. GREENSPON PIPE CO., INC., 50 South Bemiston Avenue, St. Louis 5, Missouri. Phone: PArkview 6885.

HELP WANTED

LAND MAN

Large company which is well known in Southern states has recently opened a district Geological, Exploration and Production office in New Orleans and needs for that office a land man familiar with South Louisiana. Such man should also have familiarity with Southern Mississippi. Prefer a man under 42 years of age and one familiar with farm-out negotiations, operating contracts, lease acquisitions and lease record procedure and titles. Company is entering South Louisiana on a conservative basis. In replying state age, experience in detail, education, and references, enclosing recent photograph. So as not to jeopardize your present position your application will be held in confidence. Box G-453, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS WANTED

Anderson - Prichard Oil Corporation, Oklahoma City, Oklahoma, has Production Department openings for several engineers with degrees in petroleum or mechanical engineering. Excellent opportunity for young man interested in oil producing and drilling operations or reservoir and evaluation work. A year's experience is desirable, but college education and willingness to assume responsibility are essential prerequisites. Initial location will be Oklahoma City. Applicants should write giving age, brief review of education and experience, and salary expected. Please address

ANDERSON-PRICHARD OIL CORPORATION
Liberty National Bank Building, Oklahoma City, Oklahoma, for the attention of Mr. D. F. Tver, Industrial Relations Department.

FOREIGN A. P. I. PIPE

Immediate Delivery from Houston Stock

POPULAR SIZES, WEIGHTS and GRADES

No P.A.D. Tickets Required

Phone, Write or Wire for Prices

LUCEY PRODUCTS CORPORATION

TULSA, OKLAHOMA

624 So. Cheyenne **Phone LD - 204**

HELP WANTED

PETROLEUM ENGRS., GEOLOGISTS, REFINERY MEN; Rocky Mtn. positions with Majors and Independents. Specialists in drilling, production, reservoir, refinery operation. Professional Placement Service, 516 University Bldg., Denver, Colorado.

TERMINALS ENGINEER & Supervisor: To supervise construction and maintenance of petroleum products terminals. Age to 40. Experience such work necessary. Engineering degree desirable but not required. Locate in Southeast. Some travel required. Salary open. In applying give complete details as to personal, educational and experience background, and salary expected. Box G-475, The Oil and Gas Journal, Tulsa, Oklahoma.

MUD ENGINEER

California drilling contractor has opening for man who has actual field experience. Give age, training and experience in first letter. Box G-513, The Oil and Gas Journal, Tulsa, Oklahoma.

PROCESS ENGINEERS

Engineering contractor has openings which offer excellent opportunities for young Process Engineers with background in chemical, refining, or gas & gasoline industries, for permanent position in office located in Tulsa, Oklahoma. One to five years experience is desirable but college education & willingness to assume responsibility are essential. Applicants should write giving age, resume of experience, education and salary expected. Please address Box G-519, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED

PRODUCTION SUPERINTENDENT
CHIEF PETROLEUM ENGINEER
EQUIPMENT ENGINEER
RESERVOIR ENGINEER
DRILLING ENGINEER
PRODUCTION FOREMAN
GASOLINE PROCESS ENGINEER
ASSISTANT CHIEF GEOLOGIST
SURFACE GEOLOGIST
SUBSURFACE GEOLOGIST
EXPLOITATION GEOLOGIST

For work on DeMares Concession, Colombia, South America. Excellent salary plus substantial income tax savings. Good living conditions. Two year contract. Annual local vacation and paid vacation to United States if contract renewed. Give details of age, education and experience by letter. All replies held confidential. Reply to Box G-516, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED

CHIEF GEOLOGIST

for

Aggressive Independent Oil Company

Operating in Rocky Mountain Area, Mid-Continent, North and West Texas.

Experience in these areas desirable. Give complete details of education and experience by letter in duplicate. All replies held confidential.

Box G-460
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

HELP WANTED

GASOLINE Plant Chief Chemist for water, corrosion, and product control. Graduate preferred but not required if experienced. Excellent salary and opportunity with large progressive independent. Write Box G-514, The Oil and Gas Journal, Tulsa, Oklahoma.

ELECTRIC LOGGING man with all around experience, including interpretation, operation and maintenance. Good salary and opportunity to acquire interest in aggressive electric well surveying company with good future. Address Box G-497, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL Engineer for work in natural gas and gasoline field with independent in West Texas. Gasoline plant experience desirable, but not required. Include education, complete brief of experience, and salary expected, in first reply. Box G-492, The Oil and Gas Journal, Tulsa, Oklahoma.

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

OIL Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technical and Trained Personnel, including LPG.

WANTED: Experienced Safety Engineer, for oilwell drilling contractor, with nine (9) rotary rigs operating in West Texas and Southeast New Mexico area. In applying, give age, references, and experience. Reply Box G-496, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Engineer with mechanical, Petroleum or Chemical background. Some field experience desirable. Work involves product development and manufacturing for substantial and growing Company. Opportunity for right man. Write Box 2204, Odessa, Texas. Replies confidential.

PETROLEUM ENGINEERS

FOREIGN SERVICE

Graduate engineers with good background in general physics, mathematics, mechanics and with some laboratory experience in equipment and techniques. For laboratory position responsible for theoretical experimental studies on reservoir fluid and rocks. Duties will consist of designing equipment, performing or supervising testing and analyzing and reporting results. Studies pertinent to evaluation of primary depletion practices and applicability of secondary recovery for pressure maintenance operation will be required.

Please write giving full particulars regarding personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OG-5
Arabian-American Oil Company
505 Park Avenue
New York 22, N. Y.

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628, Ph. No. 3-3141, Hobbs, New Mexico.

SITUATIONS WANTED

GEOLOGICAL ENGINEER: Age 28, 6 years experience with major in well sitting, production work, and subsurface geology, Mid-Continent and Rocky Mountains. Desire position with small company or independent in Mid-Continent. Box G-517, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN, 10 years experience all types of land transactions relating to exploration. Presently employed. Business degree, Oklahoma University. Will go anywhere. Box G-499, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 34, family, employed. 8 years major oil company experience, subsurface, surface. 4 years Rocky Mountains. Prefer position with Major or large independent in Rocky Mountains. Box G-500, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT - EXECUTIVE who now has own business desires employment with established company. Experience includes all phases of Oil Company Accounting including systems, procedures and mechanical methods. 20 years with major company. Box G-507, The Oil and Gas Journal, Tulsa, Oklahoma.

M.E. AND I.E. GRADUATE seeking manufacturers to represent in Okla. area. Three years selling experience. One year equipment buyer large oil company. Own car, single, free to travel. Box G-477, The Oil and Gas Journal, Tulsa, Oklahoma.

RECENTLY retired geologist, wide and successful experience, good health, desires part or full time engagement. Box G-495, The Oil and Gas Journal, Tulsa, Oklahoma.

CORROSION Engineer — married, seven years pipeline corrosion experience. Desires change with opportunity for advancement—preferably new transmission company or company planning Corrosion Department. Box G-494, The Oil and Gas Journal, Tulsa, Okla.

PRODUCTION ENGINEER, aggressive, extensive experience in drilling and production operations. Desire Rocky Mountain location with progressive firm. Box G-512, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST 8 years experience in oil exploration including interpretation, administration, and geological coordination work. Presently employed directing varied geophysical program in South America. Desires responsible position in oil exploration work in eastern USA. Box G-511, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN: Age 32. Experienced all phases land work. Wants to join solid progressing company. Prefer West Central Texas but will consider relocating. Available any time for interview. Box G-515, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY ENGINEER experienced in design, construction, and maintenance supervision of fluid and thermofor cat crackers, pipe stills and product treating. Desire relocation. Age 29. Box G-478, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, University of Oklahoma, married, 4 years drilling, production & reservoir experience in Rocky Mountain, Gulf Coast & North Texas desires employment with small independent in Oklahoma. Box G-520, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN

Presently employed by major company in West Texas desires position on Texas-Louisiana Gulf Coast.—Texas lawyer with two years experience in field and office. Familiar with lease purchasing, farmouts, contributions, title curing, etc. Box G-518, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASE AND DRILLING BLOCKS

FOR Central Kansas drilling deals see Lewis Short, Burrton, Kansas.

FOR SALE: Large block of ten year leases located in Nebraska's portion of the Salina Basin, Township 23N, Range 6E, Cuming County, Nebraska. Inflammable Gas escaping within 2 miles of leases. Doodles really go into action. Overall Geology indicates basement at about 3000 feet. Contact Twibell and Demaree, 211 North 13th St., Norfolk, Nebraska. Phone 812.

REAL ESTATE

Individually Designed and Custom Built

For Executive taste, this fabulous new modern Colonial home, on 5 acres, offers the dignity and charm of native stone and hand-cut shingles, with all the convenience and efficiency of modern design and construction. Located on a high ridge in New Canaan, Conn., with a superb 50 mile view of the New York City skyline, Lakes and Long Island Sound.

THE 14 ROOMS — ON 2 LEVELS include four master bedrooms with tiled baths; living room, dining room, library and play room with bar, all with fireplaces. The library has a connecting bath — also a card room with bath, which could be used as utility guest rooms. Large kitchen, fully equipped; butler's pantry, breakfast room, servant's wing with 2 rooms & bath. Storage attic. 3-car Garage. Some of the features are: Slate roof, copper plumbing, 5-zoned radiant heating system, canvas ceiling, 3-coat plaster walls. Universal electric hot water heater, 20 gal. per min. well with 3000 gal. water storage tank, many large closets with lights, beautiful oak flooring, fully insulated, silent Mercury switches, 2 sun decks and 2 terraces.

VICTOR J. SUDMAN
Darien, Connecticut • Telephone Darien 5-0629
New York Telephone DIgby 4-7016

REAL ESTATE

22-UNIT MOTEL

For Sale by owner: 22-unit motel, plus owners home. New. Beautifully furnished. Fireproof. Ill health forced owner to sell. $110,000.00 ($50,000.00 loan can be assumed); places of this quality selling at $500,000.00. On main Colorado tourist and year round highway. Only one is town. Write: 400 Livestock Exchange Bldg., Denver 16, Colo.

LEASE AND DRILLING BLOCKS

SEE A. L. Bowles, Rollow Building, Ada, Oklahoma, for drilling deals.

WILL FARM OUT 40 acre lease. Hot development spot. Flowing wells 1700'. Pontotoc County, Oklahoma. Well 90 days. 1/32nd override. Rig available. Manage if desired. O. N. Sellers, Box 606, Holdenville, Oklahoma. Phone 723.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

FOR SALE: Practically new 115 acre Oil and Gas Lease, heart of activity, Shelby County, Texas, price $5 per acre. Write C. A. Parker, Box 507, Center, Texas.

SE NEW MEXICO—A NEW OIL FIELD

We predict on evidence developed that offset well to S.I. well will open field. Engineering reports gratis to those who value facts. Close in O.R. Ride Royalty & Leases open.

W. J. PETERMAN, GEOLOGIST
1918-1953
Portales New Mexico

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

BUSINESS OPPORTUNITIES

FOR SALE BY ALASKANS

Stock in an Alaskan Corporation with leases on 66,560 acres of government leased ground, unitized in one block 90 air miles from Phillips Petroleums recently acquired property in Alaska. $1.00 per share non-assessable. Once oil is discovered the opportunity for investment is beyond the capacity of the small investor. Each certificate shall be for 100 shares or more.

BROKERS SOLICITED

ALASKA OIL AND GAS DEVELOPMENT CO.
Box 2000
(Please use air mail)
Anchorage, Alaska

ROYALTIES

QUICK CASH: Producing royalties, Overrides or Production . . . no delay. Phone 72-4533, Robert L. Kinkaid . . . P.O. Box 26, Tulsa, Oklahoma.

ROYALTIES WANTED

Producing Royalties
High Grade Only
Send Full Particulars
Address

C. C. HARMON
719 World Bldg., Tulsa, Okla.
P.O. Box 2151

ROYALTIES

PRODUCING ROYALTY and overrides for sale. Wire-write-call for particulars. JACK EAGLE, 706 City Natl. Bldg., Okla. City, Okla. REgent 6-7027.

WILDCAT COMPLETIONS

(Continued from page 159)

* Weld County: El Capitan Oil Co. 1 U. P. R. R., SW SW SE 23-12n-56w. IPP 80 BOPD, "D" sand 6,214 ft. TD 6,500 ft.

ARIZONA

Pinal County: Western Oil Field, Inc., et al 1 Government, C SW SW 31-5s-10e. Dry. TD 5,142 ft.

NEBRASKA

Cheyenne County: J. P. Sloss 1 Beale, SE SE NW 9-12n-53w. Dry. TD 5,780 ft.
Delaware Drillers 1 Raasch, NW SW NW 33-16n-49w. Dry. TD 4,777 ft.
Morris Mizel 1 Johnson, NW NW SW 17-16n-48w. Dry. TD 4,606 ft. Skull Creek 4,551 ft.

Kimball County: Superior Oil Co. 77-7 Gibson, NW SE SE 7-12n-54w. Dry. TD 6,200 ft. "J" sand 6,122 ft.
Sherrod & Apperson 1 Lukesen, SE SE SW 28-13n-55w. Dry. TD 6,488 ft. "J" sand 6,398 ft.
* Robers Oil Co. 1-A State, SE SE NE 16-13n-53w. IPP 29 BOPD, "J" sand 5,712 ft. TD 5,825 ft.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D.C. Notice is hereby given that two tracts of land containing approximately 1866 acres in the Barksdale Air Force Base, Bossier Parish, Louisiana, will be offered for oil and gas leasing through competitive bidding on the terms specified to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the lands. Title to these lands was acquired by the United States, and jurisdiction over the oil and gas deposits therein was transferred to the Department of the Interior under authority of Executive Order No. 9337 of April 24, 1943, by Public Land Order No. 884 of February 5, 1953. All bids must be submitted to the Administrator, Bureau of Land Management, Washington 25, D. C., on or before 1 p.m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check, cashier's check, or by money order made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required under 43 CFR 192.42(e)(4) and (f), Circular No. 1840. The envelopes should be plainly marked that they are not to be opened before the date and hour set out herein, and should show the number of the tract and the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of $25,000 must be furnished by a successful bidder prior to the issuance of a lease. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 1860, Title 18, U. S. Code, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 16⅔ per cent on all production. Annual rental or minimum royalty will be $1.00 per acre. Full details, including a description of the lands offered, and the form of lease offered, may be secured from the Oil and Gas Supervisor, U. S. Geological Survey, Box 311, Tulsa, Oklahoma, or from the Director, U. S. Geological Survey, Washington 25, D. C., or from the Washington office of the Bureau of Land Management. Bids must be submitted on each tract separately. If both tracts are awarded to the same bidder, such tracts may be included in a single lease. Bids must be submitted on or before 1 p.m., Eastern Standard time, June 24, 1953. Edward Woozley, Administrator.

EQUIPMENT MEN

(Continued from page 160)

Seismograph Service Corp. Reports Increased Earnings

In its report on earnings, Seismograph Service Corp. has reported a consolidated net profit gain of $50,647 over a similar period in 1952. The period covered in the report for both years was the 3 months ended March 31. Seismic service income for the first quarter of 1953 was $2,116,527, and for the same period in 1952 was $1,767,847.

Dividends paid for the quarter in 1953 was 25 cents per share, whereas in the same quarter in 1952 it was 20 cents per share.

Allis-Chalmers Organizes Rocky Mountain Region

The combination of Allis-Chalmers Manufacturing Co. district and branch office territories of Denver, Salt Lake City, Phoenix, El Paso, and Spokane into the Rocky Mountain region with headquarters at Denver has been announced by C. W. Schweers, vice president and director of sales of the company's general-machinery division. Richard D. Moody, manager of the Los Angeles district office since 1950, has been appointed manager of the new region.

A graduate of Colorado School of Mines, Moody joined Allis-Chalmers' graduate training course in 1938. He was connected with the company's Knoxville, Ky., and Chattanooga, Tenn., offices before entering military service in 1941. In July 1947 he was named manager of the company's San Francisco office.

Successor to Moody as manager of the Los Angeles district office is Richard L. Engel, who has been a representative in that office. Engel has been associated with Allis-Chalmers since 1939.

Dowell Incorporated Opens New Station at Bowie, Tex.

In late April Dowell Incorporated opened its new office at Bowie, Tex. More than 200 oil men and Bowie citizens attended this opening.

"The location of Dowell at Bowie has become necessary to provide additional service to oil operators in North Central Texas. The increased demand has been due, in part, to the increasingly widespread acceptance of Dowell's Sandfrac, acidizing, Perfojet, and other services," according to Jack Sutherlin, district manager at Wichita Falls.

The new station will be staffed by two local men, W. R. Baxter and L. D. Brooks, in addition to Jack Simpson, service engineer, and Jack Hensley, station manager.

New Orleans Sales Office Opened by Southern Engine

S. R. Carrington, secretary of Southern Engine & Pump Co., Houston, has announced the opening of an eighth sales office in New Orleans, with the appointment of C. J. (Chuck) Uthoff as representative at that branch.

Uthoff holds an M.E. from Louisiana State University, and for the past 2 years he has been employed by a manufacturer in sales engineering.

Southern Engine's new office will specialize in the furnishing of nationally known pumps and engines for the industrial field.

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LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that 160 acres of acquired land of the United States in T. 34 S., R. 40 W., and 80 acres of public domain land in T. 33 S., R. 41 W., 6th P.M., Kansas, all within the known geologic structure of the Hugoton gas field, will be offered for oil and gas leasing, through competitive bidding to the qualified bidder of the highest cash amount per acre, at 1 p.m., Eastern Standard Time, June 17, 1953, when bids will be opened. Details of the lease offering, how and where to file bids, and a description of the lands may be obtained upon request from this office. Edward Woozley, Administrator.

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